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THE CONCEPT MAP AS A FACILITATIVE TOOL FOR THE ACQUISITION OF MEDICAL DOMAIN KNOWLEDGE IN THE TRANSLATION PROCESS

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To my parents, my little sister ,Hadia, my sisters ,Dallel and Sara, my brothers ,Lamine,

Salah and Zoheir and my friend Meriem

This work is affectionately dedicated

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ABSTRACT

The present paper attempts at inquiring into the effectiveness of the concept map, when constructed by students in the translation task. It seeks to gain insights into how this tool fosters translator's learning from medical specialist texts through providing for a better organization of domain knowledge in memory. The hypothesis was tested by means of an experiment which was carried out with third year students of translation at the department of English; University of Mentouri .The students were assigned the task of translating medical texts using two different techniques: the concept map and the text analysis technique. The results of translation with concept map where then compared to those with text analysis. They were analysed by means of propositionalization to obtain, to some extent, a reliable analysis. The results corroborate the advanced hypothesis which states that the concept map would enhance the student's translation quality by fostering the extra-linguistic sub-competence. They reveal that students who used the concept map tool have a better translation quality than those who use the translation analysis technique. The majority of students who used the concept map succeeded in arranging text concepts hierarchically and linking them to concepts acquired previously and therefore integrated them easily. They were able to use knowledge they learned before from other texts to translate new texts. The obtained results bring us to suggest the possibility to incorporate the concept map in teaching and training medical specialist translation. The concept map helps in improving student's metacognition making them aware of the learning process and planning the translation activity.

List of Abbreviations

A	Additions
C	Correct proposition
DTS	Descriptive Translation Studies
E	text element
I	Incorrect proposition
M	Macroproposition
Mod	Modify
O	Omitted microproposition
P	Proposition
Pc	Partially correct Proposition
Po	Partially omitted microproposition
SL	Source Language
ST	Source Text
TL	Target Language
TT	Target Text

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CHAPTER THREE: THE EXPERIMENT

Introduction

1. Aims of the study

Teaching specialized translation has engaged many academicians because of its relevance to the economic and scientific progress. It serves as a medium for Exchanging knowledge between different linguistic communities. Therefore, researchers geared their efforts towards providing the means and the tools to train and teach students to be efficient translators.

Needless to say that the main investigated issue in translation teaching area is that of *translation competence*. Translation is a complex activity which involves different subcompetences, for which the individual is required to master the source and the target text languages, to be able to use documentation and information technologies, to have knowledge of translation principles and strategies, and to be informed about the domain and subject of the text.

The aim of this dissertation is to investigate into the instructional tools and strategies that would ameliorate the extralinguistic sub-competence, i.e. knowledge about the domain of the text. This work came after we observed, in the course of our teaching in the translation department, that students translate a great number of texts but actually retain little information. The information learned from the text is valuable in the sense that it eases the translation task as the translator would take less time searching for this information from other sources for the upcoming translations.

Our dissertation is interested in medical translation because medicine has a privileged position among other sciences as it is about human survival. Great civilizations-Indians, Chinese, Middle Eastern,and European- have realized its importance and therefore organized it and kept record of its researches .Translation and medicine go hand in hand because

translation was the means by which medical knowledge was transferred from one civilization to another.

The second reason is the nature of Algerian educational system. First year medical students have difficulties to shift from using Arabic language in the secondary school to using French at university. Our will is to help in training translators able to translate medical writings from English to Arabic because most of medical materials are written in English.

2- Statement of the problem

Translation is often regarded as a complex problem solving process which depends, among other factors, on the extralinguistic knowledge. Researches on expertise reveal that experts and novices represent this knowledge differently. The experts' knowledge is more extensive and well organized.

Among the tasks of a translator is to translate specialist's texts. To understand this kind of texts and to find the suitable register to translate them, he has to do some searches in the library or to seek the help of practitioners; however, this is time consuming, and may lead to translation inefficiency

The translator translates huge number of texts during his life career which implicate a wealth of information. This information is difficult to retrieve from memory if not well-organized. Therefore he should be provided with the tools that help him being aware of organization process, which is the main concern of the present research. The paper raises the question as to whether the concept map is an effective tool for ameliorating the translation quality.

3-Hypothesis

We hypothesize that the concept map would enhance the student's translation quality by fostering the extra-linguistic sub-competence; in other words, it can act as a metacognitive tool making the students aware of the conceptual integration process when reading a text. This process occurs if the individual organizes knowledge hierarchically.

4-Means of research and population

In order to test the advanced hypothesis, we carried out an experiment where the students were asked to translate texts using concept maps and text analysis technique. Therefore the analyzed data were translated texts.

The experiment provides somewhat reliable data as we can assess student's performance through their translations. Two groups of students were chosen randomly out of third year students of translation, which constitute 1/5 of the whole population that counts 359 students and most of them are female students. These groups were asked to translate a medical text using two techniques: the casual method of text analysis and the concept map technique. The results were then analyzed, using Kintsch's (1998) propositionalization method, and compared.The experiment took place in the department of translation-University of Constantine-where we have been teaching for two years.

5-Structure of the research

The present paper is divided into three chapters. The first two chapters constitute the theoretical background of the thesis. They deal with translation theories and the foundation of the concept map, whereas the last chapter is concerned with testing the advanced hypothesis, and therefore constitutes the practical part.

The first chapter is an overview of some of the achievements in translation studies since the first half of the twentieth century, which opens with Holmes's (1988/2006) map of the discipline .The aim is to know the position of translation teaching within this field of study .Then Munday's 2001 framework is used to introduce some translation approaches, models, and theories. The chapter deals also with medical translation and conceptualization in translation.

Chapter two tackles some of the memory models with a special focus on the network model of semantic memory for it is directly linked to concept mapping. The chapter also discusses Ausubel's (1963) assimilation theory of meaningful learning, the background of the concept map. Moreover, a definition of the concept map is provided as suggested by cognitive scientists, followed by its different forms, displayed from the simplest to the most complex. The chapter also deals with Novak's (1984) concept map.

Chapter three is devoted to the experiment, which is divided into two sections. The first section is about the site of the experiment, population choice, experimentation procedure, and the method of data collection and data analysis .The second section deals with the results and their interpretation.

CHAPTER ONE

Medical Translation and Domain Knowledge

Introduction

'Translation studies' refers to the academic discipline which inquires into translation. It has been assigned many nomenclatures. Nida (1969) (as cited by Baker, 1998) called it 'science of translation' .Roger Goffin(1971) (as cited by Baker,1998) used the designation 'translatology' in English and 'traductologie' in French. However, nowadays the term 'translation studies' is the most commonly used (Baker, 1998).

The present chapter is an overview of some of the achievements in this area of studies since the first half of the twentieth century. It presents first Holmes's (1988/2006) map, the earliest attempt to provide a framework to the discipline. Then it introduces some approaches, models and theories of translation through Munday's (2001) framework. It progresses to deal with medical translation and conceptualization in translation.

1.1Translation studies

1.1.1 Holmes's map of translation studies:

The first attempt to chart the field of translation studies was with Holmes's map (2006). It was the first theoretical framework of translation and according to Baker (1998) is still widely accepted in the translation community.

Holmes (1988/2006) divided translation studies into two: *pure* and *applied*. The former encompasses *theoretical* and *descriptive* studies. *Descriptive translation studies* and henceforth: DTS, aim at describing the translation phenomenon meanwhile translator theorist's intention is to make general principles to explain and predict such phenomenon.

Under the branch of DTS, Holmes (1988/2006) referred to three areas of investigation: the product, the process and the function of translation. *Product oriented DTS* concern themselves with the analysis of one source text and target text pair, and henceforth ST-TT pair, or with a comparative analysis of disparate renderings of ST, be it in one language or in many languages. They may also cover a diachronic (chronological) and synchronic (in a point of time) analyses of a larger body of translation.

Function-oriented DTS stress on the context rather than the text .They approach translation as a socio-cultural phenomenon in which the recipient has a higher profile. They busy themselves with answering questions as of which texts were translated in a particular place, at a given point in time, and the incoming influences. This area of research, labelled by Holmes (1988/2006) *socio-translation studies* and later *cultural-oriented studies* by Munday (2001), was less researched at the time Holmes's paper was conceived but has now come to the fore.

Process-oriented DTS attempt to disclose what goes on in the translator's brain while he engages in an act of translation. Hence, they are concerned with the process and not the product. This process is consensually complex and tough to be investigated systematically in laboratory, though the use of the technique of *Think-aloud Protocol* (the translator is invited to verbalize his thought as long as he translates) (Munday, 2001).

The findings of DTS, combined with the existing information in the relevant fields and disciplines, are used to develop principles, theories and models to predict the translation phenomenon. This is evidently the task of the translator theorist; however, Holmes (1988/2006) noted that a *general translation theory* in the true sense of the word is hard to achieve as it involves a high formalization. According to him, proposals for a general theory of translation are indeed barely prolegomena, and most of them are not theories but an

> Array of principles and axioms, postulates and hypotheses that are formulated as to be both too inclusive (covering also non translatory acts and non translations) and too exclusive (shutting out some translatory acts and some works generally recognized as translations) (Holmes, 1988/2006, p.186).

Besides claims for a general theory, 'partial theories' have emerged, whose founders were cautious to introduce words such as *towards* before the word *theory* .They can be grouped into subcategories according to the facet of translation covered. Holmes (1988/2006) argued:

> It is in this area of partial theories that the most significant advances have been made in recent years ,and in fact it will probably be necessary for a great deal of further research to be conducted in them before we can even begin to think about arriving at a true general theory. (p.186)

Translation can be carried out by machines as well as humans .The *medium restricted theories*, the first subcategory of these partial theories, is subdivided accordingly. There are machines and humans partial theories. The former can be further subdivided according to whether a translation is written or spoken and to whether spoken translation is consecutive or simultaneous.

The scond category is *area restricted theories* .They are limited as to the language and the culture studied. Concerning languages, there can be language-pair restricted theories (e.g. French-English pair) or *language-group restricted theories* (Slavic languages), or *language-group pair restricted theories* (romance languages to Germanic languages).Holmes believed these theories are tightly connected to contrastive linguistics and stylistics. In the same way, *culture restricted theories* are subdivided into *one culture*, *cultural pair*, *cultural-group* and *cultural-group pair restricted theories.*

The third subcategory is *rank restricted theories* which accentuate certain level: the word or a sentence .Holmes (1988/2006) was definitely influenced by researches geared to text linguistics, and he made an appeal to look beyond the sentence translation and examine the whole text translation.

The fourth subcategory is *text-type restricted theories'*that deal with particular texts, types, and genres. Literary texts benefited from a meticulous study; however, scientific translation at the time Holmes has written his paper was still budding. The text type restricted translation theories come to the fore with the achievements of Reiss and Vermeer (1984), which will be dealt with in the following section (Munday, 2001)

Time restricted theories also figure in this list of partial theories. As their name suggests they are limited to a given period of time. They can approach contemporary as well as old translations.

The last subcategory is *problem-restricted theories.* They concern themselves with a given problem, for example, equivalence and the existence of language universals in translation.

Holmes (1988/2006) drew our attention to the fact that more than one restricted theory can be applied at the same time on only one translation action. For example the study of the translation of novels by contemporary Colombian novelist Gabriel Garcia Marquez can be area restricted (they are translated from Spanish to English or other languages and from Colombian culture into the culture of these languages), as well as text type restricted (novels and short stories) and time restricted (1960's to 1990's) (Munday, 2001).

Under the *applied branch,* described by Bacon as translation disciplines *of use* rather than *of light*, there are *translation training, translation aids, translation policy,* and *translation criticism*. It should be noted that there are two kinds of translation training. First, translation has long been used as a technique in foreign language teaching and a test for

foreign language acquisition, which has been proved to be useless as methods. Secondly, theorists have been greatly concerned with the use of translation in schools and courses for training professional translators, as this area raises many problems; among these problems are those related to methods of training, assessment techniques, expertise, and curriculum planning. Our research is actually relevant to this discipline.

Translation aids are primordial for both translation practice and translation teaching. It is about providing the appropriate tools. It can be of two kinds: lexicographical/ terminological aids and grammars.*Translation policy* has to do with giving advice to others about the place and role of translators and translations in society, for example, the social and economic position of the translator and works that should be translated in particular socio-cultural situation.

Though used by many scholars for their theoretical works, Holmes's (1988/2006) map has been subject to criticism. Pym (1998) argued that individuality of the style, decision making processes and working practices of human translators involved in translation process should be added to the map. Toury (1991) said that considering the three kinds of descriptive studies as autonomous is to reduce

> 'individual studies to the level of superficial descriptions :
>
> -of the textual-lingusitic make-up of translated texts
>
> -of their relationships with their respective source texts
>
> -of the process through which the one was derived from the other, or
>
> -of the translation's position (function, influence, etc) in the culture in which it is embedded (p181).

1.1.2 Translation theories since 1950:

One of the most recent frameworks of the discipline is Munday's (2001).He grouped contemporary translation studies into five categories according to the characteristics they share. These are equivalence theories, translation shift approaches, functional theories, discourse analysis approaches, system theories, varieties of cultural studies, studies dealing with translating the foreign. However Munday (2001) didn't mention in his classification cognitive translation studies, which we will devote a room for in this section because of its relevance to our study.

1.1.2. (a) Equivalence theories

After a fervent debate over free and literal translation, theorists have attempted to approach translation in a systematic way. Among the issues they have investigated is that of equivalence which came to the fore with Roman Jakobson's (1959/2006) paper, entitled "Different Aspects of Translation".

Jakobson (1959/2006) disagreed with Bertrand Russell (as cited by Jakobson, 1959/2006) and believed that one can grasp the meaning of words with which he doesn't have a non-linguistic acquaintance. He gave as an example the words *nectar*, *ambrosia* and *Gods* which we don't experience but yet understand. He went beyond that and asserted that 'there is no *signatum* without *signum* (p139), and to illustrate his standpoint he gave the example of the word *cheese*. He said "Mere pointing will not teach us whether 'cheese' is the name of the given specimen, or any box of camembert or of camembert in general or any cheese, any milk product, any food, any refreshment or perhaps any box irrespective of contents**"** (pp.138, 139).

Starting from these ideas and the Peircian semiotics, Jakobson (1959/2006) contends that

> The meaning of any linguistic sign is its translation into some further sign, alternative sign, especially a sign "in which it is more fully developed," as Pierce, the deepest inquirer into the essence of signs insistently stated. (p.139)

He then broke down translation into three categories:

1-**Intralingual translation** or "rewording: an interpretation of verbal signs by means of other signs of the same language";

2-**Interlingual translation** or "translation proper: an interpretation of verbal signs by means of some other language".

3-**Intersemiotic translation** or "transmutation: an interpretation of verbal signs by means of signs of non-verbal sign systems" and then examined meticulously interlingual translation.

For Jakobson (1959/2006), words from different languages are not totally synonymous and hence interlingual translation consists of substituting messages in one language, not for separate code-units but for entire messages, in some other languages:

> The translator recodes and transmits a message received from another source. Thus translation involves two equivalent messages in two different codes.(p.139)

Jakobson (1959/2006) was an opponent of those who advocate *the dogma of untranslatability*. He instead affirmed that

> All cognitive experience and its classification are conveyable in any existing language. Whenever there is deficiency, terminology may be qualified and amplified by loan words or loan translations, neologism or semantics, and finally, by circumlocutions. (p.140)

Furthermore, he described levels of lexical and grammatical differences between languages, which are the following:

- Gender: e.g. the *sun* is masculine in Arabic but neutral in English
- Aspect: In Russian, the verb morphology varies according to whether the action is completed or not.
- Semantic fields: e.g. the German *Geschwister* means normally brothers and sisters in English as. And the English children in the statement "I've got two children" is translated as the gender-specific *hijas* in Spanish if both children are female.

Another theorist who investigated the problem of equivalence is Nida (1964) .His motive was to elevate translation to the rank of science as the title of his book suggests *Toward a Science of Translating (1964).* Nida (1964) borrowed heavily from semantics, pragmatics and Chomsky's transformational generative grammar (1957, 1965). According to him, there is no total equivalence hence the task of the translator is to find the closest equivalent. He described two kinds of equivalences: formal and dynamic equivalences. *Formal equivalence* "focuses attention on the message itself; in both forms and contents ...One is concerned that the message in the receptor language should match as closely as possible the different elements in the source language**"** (Nida, 1964, p159).

Dynamic equivalence seeks to produce the same effect on target culture audience to achieve complete naturalness of expression as Nida (1964) said:

> The relationship between receptor and message should be substantially the same as that which existed between the original receptors and the message. (p. 159)

In his "Principles of translation as exemplified by bible translating", Nida (1959/1975) illustrated the situations which face the translator in translating words meanings in terms of their referents and their function in the cultural context.

1- The non-existence of a term (and its corresponding referent) in the receptor's language .He gave as an example the word *snow* for which there is no equivalent in some languages. The expression *white as snow* can be replaced with *white as egret feather*. Egret feather is a different referent but has the same function as the former referent.

2- The existence of the referent in the receptor's language, but with a different function from that of the source language. He stated that the word *heart* in Greek ,for example , should be translated as *liver* ,as in the Kabba-Laka language of French Equatorial Africa; by *abdomen* ,as in Conob ,a Mayan language in Guatemala; and by *throat* ,as in some context in Marshallese ,a language of the South Pacific. He remarked that such substitution cannot take place if the referent is an integral part of the entire communication; instead, a foot note explaining its function is added.

3- The non-existence of the referent in the receptor language and no other referent with a parallel function. Nida(1975) said that in this case the translator ought to borrow foreign words (with or without classifier) or use a descriptive phrase.

Nida's(1964) equivalence is said to be subjective and unscientific .Lefevere(1993) contended that Nida's (1964) equivalence is still at the level of the word .Larose(1989) and Van den (as cited by Munday, 2001) asserted the impossibility of equivalent effect. Gentzler (2001) believed that Nida's theory "is less derived from scientific principles and is more an outgrowth of the nature of his religious inclinations" (p54) .He contended that Nida's foremost goal is converting the receptor to Protestant Christianity and his equivalent effect is to serve solely that aim

> Nida provides an excellent model for translation that involves a manipulation of a text to serve the interests of a religious belief, but he fails to provide the groundwork for what the West in general conceives of as a "science" (Gentzler, 2001, p59).

Despite the intense critics geared towards Nida's (1964) work, it is undeniable that he succeeded where others failed. He produced a systematical analysis procedure for translators working with all types of texts and gave drew attention to the culture of the TTreceiver (Munday, 2001).

1.1.2. (b) Translation shift approaches

Translation shift approaches are linguistic in nature. They attempt at providing detailed lists or taxonomies to categorize the translation process. Among these approaches is Vinay and Darbelnet's (1958/2006). In their book, entitled *Stylistique Comparéee du Français et de l'Anglais: Méthode de Traduction* (1958), Vinay and Darblnet (1958/2006) compared texts from two different languages, French and English, to end up with translation strategies. They presented two broad categories of translation strategies: direct and oblique translation strategies.

1-**Direct translation**: it involves three procedures:

-Borrowing: this is the procedure which consists of transferring one word from the SL to the TL because of *lacunae* usually metalinguistic in the TL, or for producing stylistic effects, for example, introducing flavour of the source culture, such as Spanish food names as *tequila* and *tortillas* and Arab words like *inchallah.*

-Calque: this procedure consists of maintaining the structure of SL, for example, *compliment of the season* which is translated as *les compliments de la saison.*

-Literal translation: this is a word-for-word translation, which is efficacious when the ST and TT are genealogically and culturally related.

2-Oblique translation: this procedure is used when literal translation is unfeasible. It is of three kinds:

-**Transposition**: this is a substitution of one part of speech with another .It can be obligatory or optional .Vinay and Darblnet (1958/2006) provided a list of the different transpositions. Among them are verb-noun and adverb- verb transpositions.

-**Modulation**: This procedure consists of changing the form of the message because of a shift in point of view. Like transposition, modulation can be optional or obligatory, obligatory like "the time when...' translated as 'le moment où..." optional like "it is not difficult" translated either "il est facile de démontrer…" or "il n'est pas facile de démontrer…"

-Equivalence: Vinay and Darbelnet (1958/2006) pointed out that the 'same situation can be rendered by two texts using completely different stylistic and structural methods.' And according to them, a large part of equivalences are syntagmatic and form phraseological repertoire of idioms, clichés, proverbs or adjectival phrases, etc.

Adaptation: This procedure is used when the situation in TL culture is different from ST culture. It consists of creating a new situation in the target culture, for example, "an English father kissed his daughter on the mouth" should not be translated as "il embrassa sa fille sur la bouche" but instead a new situation is created and the translation would be "il serra tendrement sa fille dans ses bras."

1.1.2. (c) Functional approaches

By 1970's and 1980's, there was a shift from static linguistic typologies of translation shifts to functionalist and communicative approaches to translation. Reiss (1981/2006) work on text typology and language functions is representative of this new move.

Reiss (1981/2006) defined interlingual translation as:

> A bilingual mediated process of communication, which ordinarily aims at the production of TL [target language] text that is functionally equivalent to an SL text [source language] (2 media: SL and

TL+1medium:the translator, who becomes a secondary sender; thus translating: secondary communication). (p.168)

Reiss (1981/2006) based her studies on Otto Haseloff (as cited in Reiss, 2006) idea that an 'ideal' communication is hardly achievable even in the case of one language because the receiver uses his own knowledge and expectation to interpret the message. Hence she differentiated between intentional and unintentional changes in translation.

The former are due to a difference in language structures or in translation competence. She gave examples from French and German languages.

Ex.1: 1-Je suis allée à la gare

2-Ich bin zum Bahnhof gegangen

Linguistically conditioned communicative difference: The first sentence provides information about the sex of the speaker and no information about the means of transportation whereas the German sentence doesn't mention the gender but does refer to the means of travel.

Ex.2: La France est une veuve (Pompidou at the death of de Gaulle)

Frankreich ist Witw _Frankreich ist Witwe geworden _

Frankreich ist verwitwet_Frankreich ist verwaist [orphaned]

Linguistically conditioned: *Frankreich* is neuter in German. The image of *widow* is odd to a person ignorant of French. *Waise* [orphan] is also neuter; the image of an emotional attachment programmed differently.

The second stems from differences in the objective of the original and source texts. In this case the differences operate on two levels, at the level of the language structures and the reading audiences. The translator's job doesn't reside in finding the equivalent function in the target language but in adapting the target language to the function of the source language.

Moreover, she differentiated between linguistic communication; that is communication with verbal signs and non-linguistic communication; that is communication using non verbal signs (gesture, facial expressions, speed of speech, intonation, etc.).According to her, there is a loss of information in texts because the non-verbal signs are not rendered, which makes the task of text analysis hard.

Following the division devised by Karl Buhler, by the 1930's (as cited in Reiss, 2006), Reiss (1981/2006) assigned three functions to the language: informative, expressive and appellative. She also attributed to each function a language dimension, which are respectively: logical, aesthetic and dialogic. According to these functions she established a text typology; she distinguished between informative, expressive, operative and audiomedial texts, which she labelled in 1971 informative, expressive and appellative:

1-Informative texts: the language function in this kind of texts is informative which consists of a plain communication of facts: information, knowledge, opinion, etc .Its main focus is the content.

2- Expressive texts: Their language function is expressive, which aims at a creative composition. Thus the main focus of the text is the form and not the content.

3- Operative texts: The function of the language is appellative because it seeks to make the reader act in a given way. The dimension of the language is dialogic and the focus is appellative

4-Audiomedial texts: films and visual and spoken advertisements, which support the three previous functions with images, music, etc.

For each type of text, Reiss (1981/2006) administered a method of translation

1-For the informative texts, the translator should render the whole conceptual content of the ST in a plain prose without redundancy and using explicitation when needed.

2-When translating an expressive text, he should take into consideration the aesthetic side of the text (i.e., the form). And the appropriate method towards this end is identification; (i.e., the translator should adopt the author's position).

3-The TT of an operative text should produce an equivalent effect in TT audience. The method used in this case is the adaptation

4-The audio-medial are translated by means of the supplementary method (i.e., supplementing words with images, music, etc).

Moreover Reiss (1981/2006) pointed out that translation could be assessed through two criteria: extralinguistic and linguistic.

Another functionalist theory is that of the *skopos theory* put forward by Vermeer and Reiss (1984). Vermeer (1989/2006) summarises his achievement related to the Skopos theory in a seminal paper entitled "Skopos and Commission in Translational Action". Vermeer (1989/2006) drew from the theory of action as he defined the skopos theory as:

> the particular variety of translational action which is based on a source text**.** Translation is seen as particular variety of translational action which is based on the source text (p 227).

Vermeer (1989/2006) differentiated between translational actions and translation. Translational action involves any form of action which may lead to the target text, which is not necessarily a verbal one, whereas translation is a kind of translational action which leads to the *translatum* which is the translated text.

He chose the Greek word *skopos* as a name for his theory to point out to the aim of translation. This aim and its mode are "negotiated with the client who commissions the action". The translator's task is to carry out the translational action to achieve the *translatum* according to that aim.

He formulated considerations applicable to complete and partial actions (whole text or segments of a text):

1- The source text is written in a specific situation in the source culture, which means that the translator must act as an intercultural communicator.

2- To achieve a serviceable *translatum*, trans-coding and trans-posing are to be avoided because source and target texts differ in their aims and the way of formulation and distribution of content.

3-Even when the ST and TT have the same function, transcoding is not an appropriate method to reach the translatum "transcoding, as a procedure which is retrospectively oriented towards the source text, not prospectively towards the target culture, is diametrically opposed to the theory of translational action" (Vermeer 1989/2006, p.229)

4-There is an intertextual coherence between the ST and TT .The ST is related to the TT through the skopos of the target text .Vermeer (1989/2006) gave an example of the skopos of imitating the exact syntax of the source text to provide the target audience with information about this syntax.

5-According to Vermeer (1989/2006) an action is "a particular sort of behaviour" .This kind of behaviour must be explained by its performer otherwise an action.

There are three main criticisms to the skopos theory:

1-The skopos theory is not a general theory as claimed by Vermeer .It is not applicable to literary texts because they don't have an aim.

2-The linguistic aspect of the text is neglected as the text is regarded only at the macrolevel and not at the microlevel structure**.** (Munday 2001)

1.1.2. (e) Discourse and register analysis approaches

Discourse and register analysis approaches seek to explain how language communicate meaning and social and power relations .They have been greatly influenced by Haliday's systemic functional model (1989). We will deal with one of these studies, that of House's model of translation quality assessment.

In 1977, House presented her model of translation quality assessment which she revised in 1997. House (1997) based herself

> On pragmatic theories, on Halliday's functional and systemic theory, on notions developed inside the Prague school of language and linguistics, on register theory and stylistics as well as discourse analysis...also on the notion of equivalence. (1997, p.29).

House (1997) built up her first model of quality assessment starting from the notion of context of situation which she defined following Bronislaw Malinowski (as cited by House, 1997) as the immediate environment of a text. Like Halliday (as cited by House, 1997), she asserted that "the context of situation and the text should not be viewed as separate entities" (House, p 37).

House (1997) perspective was to analyse the ST to find the functional equivalence necessary for an acute formulation of TT .According to her the textual function is defined as the use of a text in a particular situation .Therefore, she broke down the notion of situation into situational dimensions and evoked several models featuring the abstract facet of the context of situation relying on Crystal and Davy model (as cited in House, 1997)

Crystal and Davy (as cited in House, 1997) have broken down the situational dimension into three components:

A. *Individuality*: This concerns "idiosyncratic features of the language as used by an individual in unselfconscious utterance."(p.38)

Dialect: it is about the markers of geographical origin and social class

Time: it denotes the features which determine the period at which the text was written.

B *Discourse*

a .(Simple/Complex) Medium (Speech ,Writing)

b. (Simple/complex) participation (monologue, dialogue)

C Province: refers to the features of the occupational or professional activity.

Status: "it refers to the relative social standing of the speaker /writer and listener/reader in terms of formality respect, etc."

Modality: refers to the differences in the form and the medium of communication which equals the term 'genre'.

Singularity: designates the occasional personal idiosyncrasies.

Crystal and Davy (as cited in House, 1997)

The changes brought by House to Crystal and Davy model are as follows:

- she arranged the same dimensions into two sections A and B

A.Dimensions of Language User

1. Geographical Origin

2. Social Class

3. Time

B. Dimension of Language Use

1. Medium: simple/complex

2. Participation: simple/complex

3. Social Role Relationship

4. Social Attitude

5. Province

- She left out individuality and singularity stating that they can be detected through other dimensions.
- She follows Gregory (1967) (as cited by House, 1997) and broke down writing into three categories:

  -Writing to be spoken as if not written

  -Writing not necessarily to be spoken.

  -Writing to be read as if heard
- Participation (complex/simple): "A text may be either a 'simple' monologue or dialogue, or more complex mixture involving, in an overt monologue, various means of indirect participation, elicitation and indirect addressee involvement manifest linguistically, for instance, in characteristic use of pronouns." (p.40)
- She divided the status into social role relationship and social attitude. Social relationship concerns the relationship between the addresser and the addressee which may be symmetrical (solidarity, equality) or asymmetrical (authority).The Social attitude is related to formality and informality.
- Modality became part of the province. According to House (1997), Province is the occupational and professional activity and also the field or topic of the text.

Moreover, she established linguistic correlates to situational dimensions through which ST and TT are analysed and compared. She relied on the Neo-Firthian grammatical model (as cited by House,1997),convention of expressing the components of meaning by means of feature symbols such as [+/-human],[+/-abstract] ,rhetorical-stylistic concepts (alliteration ,anacoluthon),concepts from speech act and pragmatic theory ,discourse analysis, concepts of "foregrounding" and "automatization" developed by Prague school linguists.

For each situational dimension she assigned three means of analysis: textual, syntactical and lexical means. Concerning the textual means, House (1997) differentiated between three aspects:

> 1-Theme-dynamics charts the various patterns of semantic relationships by which 'themes' recur in texts…
>
> 2-Clausal linkage is described by a system of basically logical relations between clauses and sentences in a text…
>
> 3-Iconic linkage or structural parallelism occurs when two or more sentences in a text cohere because they are, at the surface level, isomorphic. (pp.44, 45)

More important, House (1997) differentiated between overt and covert errors. The former is the result of "a mismatch of the denotative meanings of ST text elements or from a breach of the target language system" (House, 1997, p45) .Errors of denotative meanings are addition, omission and substitution .Breaches of the system errors are divided into two categories: errors of ungrammaticality and errors of dubious acceptability, Whereas covert errors are related to an error in one of the situational dimensions (i.e. the function mismatch between the TT and ST).

Furthermore, House (1997) introduced translation typology on the basis of eight case studies undertaken in the original study: overt translation and covert translation. Overt translation is "One in which the addressees of the translation text are quite 'overtly' not being directly addressed …..in an overt translation the text is tied in a specific manner to the source language community and its culture" (House, 1997, p.66). House gave three types of overt source texts: Overt historically-linked source texts, linked to a particular event; overt timeless source texts, go beyond time such as works of art.On the other hand, the covert translation "enjoys the status of an original source text in the target culture." (House, 1997, p.69)

House revisited her model in 1997.She used Halliday register analysis of field, tenor and mode to which she added her earlier categories to establish a schema for analysing and comparing original texts and their translations (c.f, 1.1, p20).

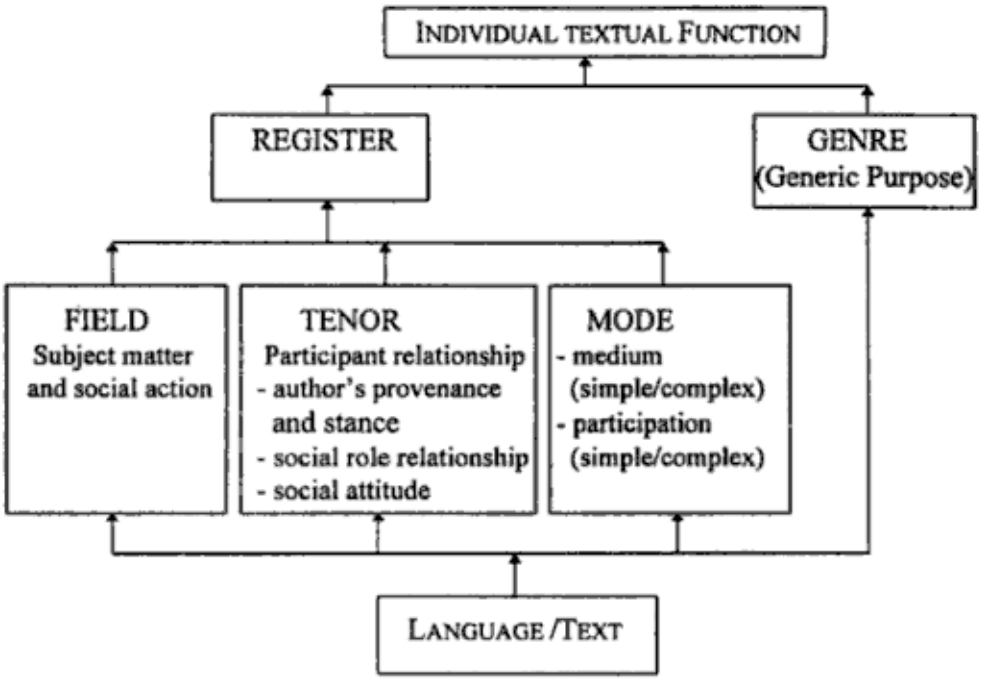


Fig1.1. Schema for Analysing and Comparing Original Translation Texts (House, 1997, p.108)

The field: "denotes the social action that is taking place. It captures what is going on", i.e. the field of activity, the topic, the content of the text or its subject matter" House 1997, p.108).*Tenor* designates "who is taking part, to the nature of the participants, the addresser and the addressees, and the relation between them in terms of social power and social distance" (House, 1997, p.108).*Mode* refers to medium and participation earlier described.

1.1.2. (f) System theories

Polysystem theory emerged at the time when socio-semiotic phenomena were perceived as "systems rather than conglomerates of disparate elements", a shift from the positivistic collection of data to a functional approach (Even-Zohar, 2005, p.1)

It is a dynamic functional theory[1] which was founded by Itamar Even-Zohan from Tel Aviv school in 1970's ,and whose essentials appeared in his book *Papers in Historical Poetics 1978* (a collection of articles he wrote from 1970 till 1978) .The theory was later revised in his article "*Polysystem theory* (revised)", 2005 .He founded this theory relying on his work on Hebrew literature which was applied on translation literature ; it is deeply rooted in Russian formalism as well as in the Czech Structuralism.

The theory starts from the principle that structuredness and systemicity doesn't imply homogeneity and hence the socio-semiotic phenomena can be viewed as

> very rarely a uni-system but is, necessarily, a polysystem–a multiple system, a system of various systems which intersect with each other and partly overlap, using concurrently different options, yet functioning as one structured whole, whose members are interdependent (Even-Zohar 2005, pp. 2, 3).

Unlike static theories which study socio-semiotic phenomena on the synchronic axis (in a specific period of time) solely, ruling out the factor of time-succession ,i.e. diachrony, to reach an illusionary structuredness and to have a better analysis of the system, it assumes that knowing the historical nature of the system helps to avoid unstructuredness and a-historical occurrences.

Evan-Zohar (2005) stressed on the dynamic stratification of the polysystem. The systemic options form a hierarchy and are in constant tension, which gives the system its

[1] Itamar Even-Zohar differentiated between dynamic and static functional theories. The former emphasises diachronism and the latter synchronism.

diachronic feature. They move from the centre to periphery or the reverse. There may be a transfer of elements or functions from the periphery of one system to an adjacent system.

Drawing upon Viktor Shklovsky conceptualization of canonicity, he posited that each system within the polysystem has canonized repertoires (they are "the norms and works which are accepted as legitimate by the dominant groups within the literary institution")and non-canonized repertoires ("the norms and products which are rejected by these groups as illegitimate and whose products are often forgotten in the long run by the community unless they change their status"),the centre being home to prestigious canonized repertoires . Hence he stressed the fact that his idea of canonicity refer rather to the promotion of concurrent repertoires as the accepted normative standards for a certain polysystem which means that its the group which controls the system who is responsible of determining the canonicity of the repertoires. We cannot infer the difference between *standard*, *high*, *vulgar*, or *slang* languages from the language repertoire, instead it is depicted through the language system, However, if the group fails in maintaining the repertoire, they will be ruled out by another group which makes his way to the center by canonizing another repertoire or keeping the already established repertoire, if proved useful to this new group.

In a seminal paper entitled "The Position of Translated Literature within the Literary Polysystem", 1978 which he revised in 1990, he asserted that translation literature can be viewed as a system as he said

> My argument is that translated works do correlate in at least two ways (a) in the way their source texts are selected by the target literature, the principle of selection never being uncorrelatable with the home co-systems of the target literature (to put it in the most cautious way); and (b) in the way they adopt specific norms, behaviours, and policies-in short, in their use of the literary repertoire-which results from their relations with the other home co-systems. (1990, p.192)

The position of translated literature is not determined within the polysystem. It can be peripheral or central. However, Even-Zohar (1990) formulated three cases where translation occupies a central position which means having a relative importance within the polysystem. These cases are

- When younger literature drew from other literature through translated works because of the lack of experience.
- When literature is either weak or peripheral (within a large group of correlated literature);i.e. it does not develop the same full range of literary activities or lack of repertoire , they import from other systems
- There are turning points within the system due to its dynamism. At a given points in time ,some literary models may be no longer acceptable by younger generation ,which makes translated works at the centre of the polysystem even if literature is central**.**This may lead also to a literary vacuum where foreign models can penetrate.

Even-Zohar (1990) considers translation as a factor of conservatism when it is at the periphery of the system because it doesn't introduce new models to the target culture literature.

He also asserted that the translation system is stratified .One section of translated literature may occupy the centre and another may be at the periphery of the polysystem .From polysystemic analysis, it is often from the vantage point of the central stratum that all relations within the system are observed.

According to Even Zohar (1990), the position of translated literature determines the translation strategy used .If it is central, translators doesn't take the original as a model, which may lead to new models in ST; reversibly the original is conserved.

Among the critics geared towards Even-Zohar is that he didn't define what literary is and said it changes from one culture to another ,but "if we do not have at least a rough idea of what the literary is in its possibility divergent manifestations ,we will not know what to look for in these different cultures" (Fokkema & Ibsch ,2000,p114).However he has contributed to bridge translation and linguistics again after the break up in the 1970's and paved the way to the interdisciplinary translation studies.**(**Bassnett, 2002).

1.1.2. (g) Variety of cultural studies

The publishing of the volume essays Translation, History and Culture (1990) (as cited by Munday, 2001) marked a shift in interest in translation studies. Lefevere and Bassnet (as cited by Munday, 2001) the editors dismissed linguistic theories saying that even though they went beyond the sentence and the word to the text level, they disregarded an important element of the text: culture. These new studies are instead interested in cultural issues such as ideology and gender and their implication to translation (Munday 2001).

Lefervere (1992) studied Germanic languages in Ghent (Belgium) and literary translation in Essex (Britain).He taught at the University of Hong Kong, Antwerp and Austin, Texas, where he focused his attention on translation studies. He was an advocate of descriptive studies, however he founded his own theory by the 1980's which is culture oriented (Baker, 1998).

According to him,

> translation is …a rewriting of an original text . All rewritings, whatever their intention, reflect a certain ideology and a poetics and as such manipulate literature to function in a given society in a given way. (p.VII, 1992b)

Lefevere (as cited in Munday, 2001) contends that the "intrinsic value "is not the one responsible for the rejection or reception of a literary work. He instead introduces three control factors which shape the literary system in which translation is contained:

Professionals within the literary system: They are critics and reviewers (Lefevere [as cited in Munday,2001] gave the example of the survival of feminist writing and revival of John Donne poetry thanks to T.S Eliot) , teachers and translators who fix on the poetics and at times the ideology of the translated text.

Patronage outside the literary system: Lefevere (1992b) asserted that "Translators tend to have relatively little freedom in their dealing with patrons, at least if they want to have their translations published" (p19).He quoted Du Bellay's (1555-1560) (a French poet, literary theorist, and (auto) translator) statement on the restrictment imposed to translators by their patrons, which is extracted from his *Défence et illustration de la langue française, 1549* saying that "the obedience one owes [to patrons] admits of no excuse in these matters" (as cited by Lefevre ,1992b, p.19)

Lefevere (1992a) defined patrons as persons or institutions which can promote or obstruct reading, writing and rewriting of literature. They are influential and powerful figure in a given point in history, groups of people (media, publishers etc) and institutions (academic journals, educational establishments etc.).

According to him, patronage is made up of three elements which are the following:

- the ideological components: it is about choosing a topic and the form of its presentation.
- the economic component: refers to the payment of writers and rewriters
- the status component.

The dominant poetics: it comprises

- Literary device**:** it refers to genres, symbols, leitmotifs, and prototypical situations and characters.
- The concept of the role of literature**:** the relation literature undertake with its social system.

1.1.2. (h) Translating the foreign: The (in)visibility of translation

Theories in this category busy themselves with cultural differences and the issue of foreignness in translation. For them translation strategies have to do with ideology and the dominant discourse. Among the theorists in this category is Laurence Venuti (1994).

Venuti (1994) spoke about the invisibility of the translator showing the position of the translator activity within the Anglo-American culture. The translator is invisible and creates an "illusion of transparency" when he translates fluently into English and the target culture audience conceive and read the text.

He also dealt with two translation strategies: Domestication and foreignization which are rooted into schleiermacher (as cited by Munday, 2001) essay "Ueber Die Verschiedenen Methoden," He complains about **domestication** which involves "an ethnocentric reduction of the foreign text to (Anglo-American) target language cultural values" (1994, p20). It also involves a process of canonization through selection of certain types of texts on which this strategy can be applied.

Foreignization which he called **resistancy** in his book *The translator's invisibility:A History of Translation*, 1994 and **minoritizing** in his *Scandals of Translation*, 1998 (as cited in Munday 2001) "entails choosing a foreign text and developing a translation method along lines which are excluded by dominant cultural values in the target language" (Venuti 1997, p242, as quoted by Munday,2001,p.147) .Venuti favours this strategy which, according to him, helps in limiting the "ethnocentric violence of translation" due to domestication strategy.

1.1.2. (i) Philosophical theories:

"Modern Philosophical theories sought out the essence of (generally literary) translation" (Munday 2001, p.163) .They are deeply rooted in philosophy; especially phenomenology. Among the leaders in this move Steiner (1992) a scholar, critics, fiction writer who has proposed his 'hermeneutic motion' in a book entitled *After Babel*, 1992. This book, when first published, has received fierce critics by Orthodox as well as transformational-generative linguists and grammarians (Steiner, 1987) but ended up by being qualified with monumental work by many scholars especially in the field of translation theorization (Munday 2001, Weissbort& Eysteinsson 2006).

Steiner (1992) based himself on hermeunitic tradition which is rooted in Jewish Gnosticism and Kabbalism and modern hermeneutic-existential philosophy of Heidegger and Gadamer (Weissbort & Eysteinsson, 2006). He viewed translation as "a hermeneutics of trust (élancement), of penetration, of embodiment, and of restitution." (Steiner, 1992, p 319)

Hermeneutic of trust: translation begins with an act of trust which can be betrayed by nonsense. In Steiner's words:

> It is an operative convention which derives from a sequence of phenomenological assumptions about the coherence of the world, about the presence of meaning in very different, perhaps formally antithetical semantic system, about the validity of analogy and parallel (Steiner, 1992, p.312).

Hermeneutic of penetration: Steiner (1992) based himself on Heidegger who views understanding as a mode of attack to appropriate another entity. Steiner (1992) demonstrated in the first chapter that translation is a matter of understanding .Beginning from this thought he asserted that translation involves attack and appropriateness. He followed Heidegger who views recognition understanding and interpretations as modes of attacks, and to give an

intuitive understanding of his stand, he evoked St Jerome image of meaning brought home by the translator. The translator invades, extracts, and brings home.

Hermeneutic of embodiment or incorporation: translation consists of importing meaning from the source T and incorporating it into the target language "Whatever the degree of naturalization, the act of importation can potentially dislocate or relocate the whole native structure" (page 315).

Hermeneutic of restitution: the last stage of the hermeneutic motion is that of compensation (restitution) in which the translator seeks to establish balance as he had produced unbalances in the target language, as described by Steiner using the image of meaning brought home by the translator

> We circulate and invade cognitively .We come home laden, thus again off-balance, having caused disequilibrium throughout the system by taking away from the other and by adding , though possibly with ambiguous consequence ,to our own. The system is now off-tilt. The hermeneutic act must compensate. If it is to be authentic, it must mediate into exchange and restored parity. (p. 316)

Orthodox as well as transformational-generative linguists and grammarians have given *After Babel* an uneasy reception. Steiner said "One mandarin luminary accused me, not altogether unfairly, of wanting to do what only 'a team of scholars and specialists should undertake; another began his review by describing' this bad book which is also, alas, a classic" (a condemnation to be gratefully borne) '(Steiner, 1987, p.16).

1.1.2. (m) Cognitive approaches to translation

They are process-oriented approaches and rely on findings in cognitive sciences. The main perspective of researchers under this category is to find how translators make decisions in translation. Hence translation is viewed as a decision making process. They have also

investigated such issues as translation competence, expertise and providing cognitive models for translation competence. They make use of thinking aloud protocols as a tool to know what goes on in the translator's black box.Their leading idea is that the translator has

> at least a partial control over what she is (mentally) doing, and that the mental activities involved in a translation are at least partially or potentially accessible .i e open to conscious inspection by the translating subject, and can verbalize accordingly (House, 2000, p. 51).

Lorscher (2005) is in this array of investigators who assert that translation raises problems, which necessitate strategies to be solved. These strategies are "procedures for solving problems. They range from the realization of the translational problem to its solution or the realization of its insolubility by a subject at a given moment" (p.600).

Lorscher's model have the form of a hierarchy in which the elements of translation strategies occupy the highest and the lowest position and in the middle position lay the manifestations of these strategies.Translation versions are either within strategies elements or can have several strategies which make them intra- or interstrategic phenomena.

He differentiated between two kinds of translation strategies: original (i.e., constitutive) and potential.Original strategies take place during the strategic problem solving phase of the process. Potential strategies may also occur in the non-strategic phase. The strategic phase begins from the realization of the translation problem and ends at its solution or insolubility whereas the non-strategic one starts with the extraction of a unit of translation and finishes when it has been preliminary rendered into TL.

Our research is based on these studies. It doesn't attempt to unlock the black box, or to specify the nature of translation competence, but to suggest tools to help improve translation competence. We will tackle the issue of competence in details as to its relevance to our study.

Now that translation studies have been examined, the chapter progresses to consider medical translation. As there is no body of literature which classifies medical translation researches, I suggest dealing with some of them in a chronological order; examining the whole researches about medical translation is beyond the scope of this dissertation.

1.2 Medical Translation since 1950

Through the first half of the twentieth century, translator theorists and practitioners busied themselves with the issues of the translation of literature and showed practically no interest in scientific rendering .For example, Dolet 1540, Schleiermacher (1813), Steiner (1992) devoted their reflections to the problems of the translation of literature; however, by 1960's, scientific translation began to take the lead (Van Hoof 1981).

Medical translation falls under this last category of translation. It is an ancient activity just as theology-philosophy and astronomy_geography (Fischbach,1986).Translation theorists geared their efforts towards this terrain because of the increase of market demand for translating medical materials like reviews leaflets and textbooks(Lee-Jahnke, 2001).They raised such problems as its historical aspects and the best method to teach it.

Van Hoof (1981) investigated the history of medical translation to demonstrate its ancientness. He said

> "Avec la traduction religieuse, la traduction médicale est probablement une des branches les plus anciennes de l'activité traduisante : les souffrances de l'âme et du corps ont toujours été au centre des préoccupations de l'homme .Le plus ancien des documents serait le Corpus Hippocraticum, une compilation des enseignements d'Hippocrate faite au IIe siècle avant notre ère par des médecins grecs d'Alexandrie. (p.25)

Following the same highway ,Leon McMarrow (1998) inquired into changes in medical language .Starting from Greek and Latin civilization, he reported two factors

influencing that change: the pull (borrowing) and push (imposition) factors. He began his excursion from Hippocrate at the end of the 5th century and stopped for a while at Galen to report the dominance of medical research on Southern European and Middle Eastern medical world and to speak about two waves of translation, the first from Greek to Arab , which became a mediator between Greek and Latin, and the second from Greek to Latin (1500).He also spoke about Galen ,as an important figure in medicine ,and medical schools: Greek schools in western Egypt and Asia ,Toledo ,Montpelier Bologna. .McMarrow (1998) also drew attention to the quasi-uniformity of medical terminology among the western European languages, including eponyms, acronyms, trade names, and abbreviations.

Translation researchers have been highly concerned with teaching medical translation because the market needs efficient translators, able to approach specialized texts without any difficulty .They investigated ways to teach the different aspects of medical languages, the use of documentation and the domain knowledge.

Drawing upon her personal experience in training undergraduate students at the university level, who have no career in medicine, Lee-jahnke (1998) hammered out in an important paper entitled 'Training in Medical Translation with Emphasis on German', the aspects that should be stressed on in translation training. According to her, a future medical translator should have access to theories applicable to scientific translation. She cited the skopos theory (*c.f* section 1.1.2 (c)).Another theory, she singled out, is that of text typology by Susanne Gopferich (as cited by Lee-jahnke, 1998) in which scientific texts are arranged into categories. She was also concerned with the type of information the text vehicles as she differentiated between non-socioculturally defined information relevant to all languages and cultural backgrounds and socioculturally determined information which concerns certain cultural circles or which has different content in different cultural circles. Lee-jahnke (1998), furthermore, formulated three goals in medical translation teaching: the text structure in

different languages, the language of specific purposes and the special domain. She pointed out to problems encountered in medical translation that she considers are of great difficulty and provided their solutions: terminology, acronyms, medical eponyms, predominance of English and medical phraseology problems. In another paper entitled 'la traduction médical un double défit', she expanded her ideas and tackled the factors of motivation and the use of documentation in more details .Motivation can be enhanced through better knowledge of medical domain. Achieving this goal, a medical introduction to medical language should be provided with an interdisciplinary teaching where the students of translation meet those of medicine to exchange information. For documentation, Lee-jahnke (1998) argued that as information is growing in an incredible way, the students should have mastery of documentation use. A course on how to take benefit of documentation must be administered.

Always in the domain of teaching, Davies (1998), in an attempt to narrow the gap between market demands and university learning, carried out an experiment in which participants are undergraduate medical students. They were put into direct contact with potential clients, with the instructor acting as a counsellor and not as a problem solver.The translations were then assessed for their acceptability. Her research was carried out in a four-months course on medical translation at the *Facultat de Traduccio I Interpretacio* (Vic, Barcelona) with inexperienced students, and looking to answer four main questions:

1- Is it possible to more closely align university progress and professional needs?

2-How good are third year students at producing a text for specialized publication?

3-In which direction should our teaching go? What are we preparing our students for? Where do the main problems lie? : In the language, in the background knowledge, in the curriculum design or in a combination of all these? She designed the course around four main issues:

1-Research skills

2-Technical writing skills

3-The building of background knowledge

4-Awareness of the translation process

5-Assessment of the final product by field specialists

Among the findings she ended up with is the high rate of coincidence between the specialists' and instructor's assessment.

Vandaele (2003) was interested in the integration of computerized material in the translation course to foster student's background knowledge in both translation and medicine. The material she spoke about is the WebCT. It is used in Florida International University to offer distant lessons of medical translation, Spanish-English. However, in Montreal University, it is utilized to back up the translation courses of medical translation, English-French .This programme consists of different tools that serve for a given objective .For example, the programme structures the lesson by displaying the course plan. It enables communication between students through emails .It gives access to students to different documentation resources of the domain through links to pertinent libraries and online databases. Furthermore, it enables the student to acquire medical terminology through exercises presented for the upcoming lectures or through quizzes either scored or not. More important, is the glossary of the basic terms used in the course it displays, which enhance the student's competence in translation metalanguage and terminology. Vandaele (2003) said that the programme is not without problems .For example, the teacher is invited to master the application software but also to train students to make use of. Students find it intricate to surf in the site and use passwords and create new folders to control site exploitation.

1.3 Domain knowledge and translation

1.3.1 Translation competence

Translation is a complex activity involving various skills: reading, comprehension, perception, writing and attention .This is the reason why translation competence is viewed as a combination of many sucompetences .A number of models were proposed to describe translation subcompetences.

Process in the Acquisition of Translation Competence and Evaluation [PACTE] group's[2] model provides a good description of translation competence; the model is still under investigation. It is made up of five subcompetences and psychological components.

First, bilingual subcompetence involves pragmatic, socio-linguistic, textual and lexical grammatical knowledge in each language. The extra-linguistic sub-competence is about knowledge of the culture, the subject and the domain. The translation subcompetence is about understanding translation principles, for example, the processes, method and procedures and also principles of the profession (types of translation briefs, users, etc).The instrumental sub-competence, on the other hand, has to do with knowledge about the use of documentation sources and information technologies related to translation. Moreover, the translator is considered as a problem solver who should have strategic sub-competence to plan the process, evaluate the obtained partial results of the process, orchestrate the different sub-competencies, identify the problem and choose the suitable procedures to solve it. The psycho-physiological components are cognitive, behavioural (memory, attention, memory-span, perseverance, critical mind, etc) and psychomotor mechanisms. The PACTE group eliminated bilingual sub-competence in case of bilinguals who have already knowledge of source and target language.

[2] PACTE research group was established in 1997,and was officially recognized as a consolidates research group in 2002.Its main objective is to inquire into translation competence and the process of acquisition of translation competence to ameliorate the teaching translation.

1.3.2 Developing the Extra-linguistic Subcompetence:

We will first speak about the different types of sources of extralinguistic knowledge. Daniel Gile (1995) spoke about three categories: the pre-existing knowledge, the knowledge of the translated text and knowledge acquired from external sources.

1.3.2. (a) Sources of Information

Sources of information can be classified into three categories: sources on paper, human sources and electronic sources (the data are stored on computer disks, diskettes, magnetic tapes or CD-ROMs)

Non human sources are further subdivided into terminological sources such as dictionaries and non-terminological sources like books and thematic articles. Terminological sources are materials used by the translator to know words meaning and their equivalent in the target language .Non terminological sources are used to understand the meaning of the whole text though they may be used to know words meaning.

Most salient are human sources for translating specialized texts: “an expert in the field can provide highly reliable information more rapidly than any book or database” (Gile, 1995, p 145).These sources can be starting- point sources or end-point sources. This means that the translator can rely on them in the phase of comprehension, when the expert is native speaker of the source language or in the phase of formulation if the speaker is native speaker of the target text. Moreover, the translator can choose to work cooperatively if the expert is an end user (i.e. the translation is for the expert’s own profit) .This cooperation is underpinned by the translation having personal relationship with the expert.

1.3.2. (b) The pre-existing knowledge

It consists of knowledge the translator has in brain while being in a given situation of translation. The translator is confronted with many types of texts ranging from; laymen's texts to experts' texts .In the former the translator makes use of world knowledge; however, in the latter he has to hold some degree of expert's knowledge in his mind. There is a debate within translation society about the capacity of translator to render specialists' texts. There are those who take a radical position. Folkart (1984) said "the technical translator's stock in trade is an in-depth understanding of the referent" (p.299 as quoted by Gile, 1995, p.131).The same was advocated by V.Kourganoff (as cited by Gile, 1995) .Others adopt utterly different position. Gile (1995) contends that "A minimum of pre-existing knowledge is necessary to disambiguate the source text and select the proper target equivalent" (p.85).The translator need not to possess the whole expert knowledge to perform a decent translation. The student can be provided with a technique to help them reach some of the expert knowledge, which could help them to translate highly specialized texts.

1.3.2. (c) Text knowledge

Another source of extralinguistic knowledge is the text to be translated .The translator acquires information from the text he translates which can be used for future translations. Hence "It is important for the translator to maintain a high level of attention through out work on the text so as to incorporate new information into the existing Knowledge Base" (Gile, 1995.p85). The translator retains in his memory much information that is unstructured and volatile. To help the student structure and organize this knowledge, he should be provided instructional tools. Our research circles around this topic. It is about the concept map

Before dealing with this instructional tool, it is important to know the difference between novices and experts and the way they acquire knowledge.

1.3.3 Expertise

There is a large body of literature contrasting experts and novices in different domains: mathematics, physics and medicine, to name only few. They generally agree that experts solve problems in a more efficient way than do novices. Glaser, Lesgold and Lajoie (1985) formulated six areas in which experts differ from novices:

-Knowledge organization and structure

-Depth of problem representation

-Quality of mental models

-Efficiency of procedures

-Automaticity of performance

-Metacognitive skills for learning

Knowledge organization and structure: Approaching a specific problem requires knowledge domain that the problem is about .Experts accumulate a huge amount of knowledge that enables them be effective problem solvers. However, Anderson (1974) contended that "a particular fact is more slowly retrieved when the concepts that compose it occur in more other facts"**.** This phenomenon is called the *fan effect* and takes place when there is no internal cohesiveness or integration of the different facts related to a given entity. (*Smith, Adams, and Schor, as cited by* McGilly,1994).

How comes that the Expert doesn't demonstrate such irregularity? Investigations demonstrated that experts have a well- organized extensive knowledge that enables them integrate newly acquired knowledge.On the other hand, novices' conceptual knowledge is less structured. Connections between concepts are not well elaborated.

Depth of problem representation: Problem representation refers to the manner in which the information about a problem is mentally organized. Experts and novices differ in the depth of

problem representation .Experts rely on principles of the discipline to visualize the problem .In contrast novices rely on problem's surface features.

Quality of mental model: Novices' models are ill-structured. The concepts and systems are not well connected. However Experts' models are well-organized and representative of their domain of knowledge .Considering student's mental model of proportional reasoning, for example, a student sees division, fractions and decimals as separate arithmetic systems, rather than linked into single system.

Efficiency of procedures: Experts make use of *short-cuts* and *quick tricks* to solve the problem .They spent less time in solving the problem by eliminating steps. However novices tend to follow the problem solving steps.

Metacognitive skills: Experts and novices engage in a metacognitive process when they strive to solve the problem. They monitor their thinking while drawing their way to the solution. They orchestrate their knowledge when choosing a strategy or planning the task.

In this chapter we examined some of the translation studies and we focused on medical translation as one translation research domain, for its relevance to our research. We have also considered an important issue in translation teaching: the translation competence. We have rendered extra linguistic competence in details and stressed on the importance of conceptual domain knowledge for the translation task. In the following chapter we will deal with one of the tools which would help to improve students' translation of specialized medical pieces of writing.

CHAPTER TWO THE FOUNDATION OF THE CONCEPT MAP

Introduction

Introduction

This chapter begins with an overview of the different memory models with a special focus on the network model of semantic memory ,for it is directly linked to concept mapping. The chapter progresses to discuss Ausubel's (1963) assimilation theory of meaningful learning which was behind Novak's (1984) idea of the concept map. After that the definition of this latter is supplied, as it was proposed by cognitive scientists followed by its manifold forms, displayed from the simplest to the most complex .The chapter closes at Novak's (1984) concept map which will be used in this study.

2.1 Memory system

As our research is raising the question about the effectiveness of the concept map in making the student aware of organizing conceptual knowledge for acquiring it, it is worthy to investigate how this latter is stored in our semantic memory. We will begin first describing the memory system through some models proposed by cognitive psychologists. Then a distinction is made between semantic and episodic memory. Next we move to speak about network hierarchy of knowledge in the semantic memory through Collins and Quillian (1969) model of semantic memory.

Memory is defined in terms of its function as a store of our knowledge about the world, be it facts or events, but also for its role in shaping our present and future life (Stuart-Stuart-Hamilton, 1999).Several models were proposed to describe how information is stored in our brain and the way it is processed.

In the late 1960's Atkinson and Shiffrin proposed a model of memory that generated an excitement within the cognitive community. "The model begins with the common notion that whatever we learn has to be encountered through senses." (Stuart-Hamilton, 1999, p156).It is made up of three components: sensory store, short term store and long term store.

According to the model, the sensory memory, which is considered as part of the perceptual system, receives the information from the outside world to transmit it to the limited capacity called the short term store and henceforth STM. The two scientists assume that the relation between the time information is maintained memory and its transfer into long term memory,and henceforth LTM,is linear (A. Baddeley, 2002).However this model was criticized by the early 1970s, mainly for two reasons. The first one is related to learning .It was proved that merely holding an item in short term memory doesn't assure learning .The second reason was the problem with data as it shows that STM and LTM are associated , in contrast to what Atkinson and Shiffrin reported (Baddely 2002).

There are other models which emerged from critics to Atkinson and shiffrin's model. Craik and Lockhart (1972) proposed the levels-of-processing framework, assuming that performance is determined by the level of processing given to the to-be-remembered material. The model is made up of two components: primary memory and secondary memory; there is less information processing in the primary memory than in the secondary memory.

Baddely and Hitch (1974) criticized Atkinson and Shiffrin's *modal model* as to short term memory. They carried out a study on brain-damage patients having deficiency performance on tests of short-term memory, but normal performance on long term learning tasks. The experiment attempted to prove the failure of the *modal model* which asserted that information passes through STM before going to the LTM .Baddley and hitch (1974) proposed instead their model of short term memory. They advocated that short term memory is not a unitary faculty .It is made up of three components: two *slave* systems-the phonological loop and visuospatial sketchpad, devoted to temporary storage and maintainance of information and a central executive responsible for control processes, such as reasoning planning and decision making (Hambrick et al, 2003).

A fourth component of working memory has been proposed, the episodic buffer; its function is to integrate information from the subsidiary systems with that of LTM.

In respect to long term memory, a distinction is made between implicit (non-declarative) and explicit (declarative) memories. In the former information is directly accessible through performance. It relies on Papez[3] circuit, which links between the hippocampi and frontal lobes. Explicit memory has further been broken down into episodic and semantic memory. (Baddeley2002).

However there are two different views about the criterion with which semantic and episodic memory are distinguished. Tulving (1972) (as cited by Eysenck, 2004) defined episodic memory as "the storage, (and retrieval) of specific events or episodes occurring in particular place at a particular time" (p.386, as quoted by Eysenck, 2000, p.186) and he viewed semantic memory as

> a mental thesaurus, organized knowledge a person possesses about words and other verbal symbols ,their meanings and referents, about relations among them and about rules, formulas ,and algorithms for manipulation of these symbols ,concepts ,and relations. (Tulving, 1972, p.386, as quoted by Eysenck, 2000, p.186)

The other criterion was brought by Wheeler, Stuss, and Tulving (1997) (as cited by Eysenck, 2000). They asserted that one way to distinguish between semantic memory and episodic memory is the dependence of the former "on special kind of awareness experienced when one thinks back to a specific moment in one's personal past and consciously recollects

[3] Papez circuit was proposed in 1937 as the basis of emotion by Papez within a study that he carried out on rabies ,a disease that produces high aggression .Mcllveen and Gross (1996,p.153) said that this circuit "forms a closed loop running from the hippocampus to the hypothalamus and from their to the anterior thalamus.The circuit continues via the cingulated gyrus and the entorhinal cortex back to the hippocampus" (as quoted by Eysenck,2004 ,p.161)

some prior episode or state as it was previously experienced" (1997, p333, as cited by Eysenck , 2000 ,p.186).

Despite their disparity, the flow of information in both kinds of memories (semantic and episodic memories) is almost the same (*Eysenck* 2001).In other words, they have the same methods of encoding storage and retrieval. Encoding is about encrypting information; storage involves holding information whereas retrieval refers to information access through explicit or implicit recall (Baddeley 2002).

2.1.1 Semantic Memory as a Network

It is worthy to deal with semantic memory in detail mainly for two reasons:(1)its relevance to learning relevance to learning (2) and the concept map is " the coherent representation of new information in the semantic memory" (Holley et al 1984 ,p.14 as quoted by Tergan,2005).

Network theories consider semantic memory as a network. Consider the city map, it has the form of a network; nodes are the cities and the links are highways. The same thing applies for memory, except that the nodes are concepts tied to each other through associations. Among the theorists who have approached memory as a network are Collins and Quillian (1969). They claim that "semantic memory is organized into a series of hierarchical networks. The major concepts in each network (e.g. animal, bird, canary ….etc) are represented as nodes, and properties or features (e.g. has wings; is yellow) are associated with each concept". The general concepts are at the top of the hierarchy and specific ones are at the bottom (Eysenck, 2000 p.327). The two researchers pointed out to the factor of economy in knowledge storage. They advance that shared features and properties between instance concepts are not echoed for each concept, instead they are stored as far up the hierarchy as possible.

This model explains the deduction phenomena in memory. If we know A is a subset of B, and B a subset of C, then A is a subset of C .Another deduction is that if A is subset B and that B has property P, then A has property P. it is a novelistic model because it assumes that inference reaction time is related to the hierarchal position concepts or features occupy (Anderson et al, 1980)

Nonetheless, it has encountered problems. Conard (1972) reported problems related to the hierarchical factor in information storage .He gathered sentences where the degree of familiarity, not hierarchy is responsible for storage. Despite its drawbacks the model is prominent as it gave raise to the idea that memory is a kind of network, which is at the basis of other models such as the connectionist model.

2.2 Understanding concepts

Novak (1998) defined the concept as a perceived regularity in events or objects, or records of events or objects, designated by a label. For example, the paper you perceive is an object and reading it is an event.

According to cognitive psychology, knowledge does not simply accumulate .It is organized and had a "structure of its own" (Hashweh, 1986, p, 232). The scientific texts are overloaded with concepts because we know that the outcome of sciences is concepts, principles and theories. The concepts represent ideas about facts, which are perceivable and measurable realities about the world. These concepts are interrelated according to principles

2.3 Ausubel assimilation theory of meaningful learning

Ausubel (1963) is a developmental psychologist, who is best known for his distinction between educational psychology and psychology, but also for his assimilation theory of meaningful learning, which advances that human learning is an integration between cognitive,

affective and psychomotor meaningful learning (Novak 1998) .Cognitive learning refers to the acquisition of knowledge, psychomotor learning is the acquisition of skills and affective learning is the acquisition of feeling. In our study, we focus on cognitive learning and its implication for the concept map.

In his seminal book entitled *A Subsumption Theory of Meaningful Learning and Retention, 1962,* Ausubel presented his theory of meaningful learning, which was further eroded in his forthcoming publications: *The Psychology of Meaningful Verbal Learning: An Introduction to School Learning 1963* and *Educational Psychology :A Cognitive View, 1978.* This theory came into a world where positivistic epistemology and behaviourism still dominated thought, which advocates that the explanation of behaviour through belief, intention, and desire (Mental Way Station) is somehow unscientific, made it hard for Ausubel's theory to be soon recognized in America, as it was the case for Piaget. Moreover, Ausubel found obstacles in publishing his works in well-known journals of psychology (Novak 1998).However he found support in Europe and Asian countries, where behaviourism was not a dominant doctrine, and in some circles in North America.

The differentiation between meaningful and rote learning is at the core of Ausubel's theory. For him "Meaningful learning is a process in which new information is related to an existing relevant aspect of individual's knowledge. However, the learner must choose to do this. The teacher can encourage this choice by using tools as the concept map" (Novak, 1998, p51).However Rote learning may occur "when there are no recognized relevant concepts in the person's cognitive structure" (Hellden, 1999, p 24).

The following sentence summarises his assumption (as quoted by Novak,1984)

> If I had to reduce all educational psychology to just one principle it would be this: The most important single factor influencing learning is what the student already knows. Ascertain this and teach him accordingly. (p.40)

There are six basic principles which ought to be understood to grasp Ausbel's notion of cognitive meaningful learning .First ,subsumption is a process through which a concept is assimilated by another existing concept in the brain .The anchoring concept, labelled by Ausubel a subsuming concept or subsumer, guides the movement of the input information through the perceptual barriers and link it to the cognitive structures .Studies demonstrated that this process lead subjects to recall the studied material in contrast to rote learning in which the material has to be reiterated to be remembered (Novak,1998) .Second ,the progressive differentiation ,the subsumed concepts are refined and elaborated through linkage with the input concepts .This process starts in childhood and continues through out life (Hellden,1999). Third, integrative reconciliation, subsumption and progressive differentiation changes the cognitive structure quantitatively but also qualitatively in that the number of concepts increases and their meaning changes to some extent .A broad general newly recquired concept can subsume another specific pre-existing concept, which is called the superordinate learning principle. Finally the advance organizers which are introductory prose, conceived by Ausubel in an attempt to foster reader's learning from reading materials . According to him, this tool is effective in correlating between the prereading information and the student's existing schema merkley and Jefferies, 2002)

The advance organizers were adopted and modified by many researchers. Barron (1969), Earle (1969) and Baker (1977) (as cited by merkley and Jefferies, 2002) replaced the introductory prose with an outline format termed 'structured overviews'. They were soon applied to the different stages of reading tasks: prereading, during reading and after reading after being expanded to hierarchically organized visual display of information, and the term structured overview was replaced by graphic organizers.

The concept map is deeply rooted in advance organizers; it is an adaptation of graphic organizers, which consists of visualizing concepts and connecting them with labelled link. They were

conceived by Gowin and Novak (1984) to be used as a metacognitive tool helping students become autonomous learners by enabling them to reflect on their learning.

2.4 The definition of the concept map

The first definition was provided by Novak (1984), which is general and lacks precision:

> Concept maps are intended to represent meaningful relationships between concepts in the form of propositions. Propositions are two or more concept labels linked by words in a semantic unit. (p.15)

Pankratus and Keith (1987) said that

We think with concepts. Concept maps serve to externalize these concepts and improve our conceptual scheme. A concept map is a two dimensional hierarchical organization of structure of discipline, a unit of study, or even a paragraph. It indicates the relationships between concepts. It is a dynamic device that changes as our view of the universe is modified and refined. (p.3)

This definition emphasises the dynamic aspect of the concept map and the externalization of thought. It also defines more precisely its shape using the terms “two dimensional hierarchical organization”.

From the two definitions aforementioned we deduce that the concept map is a graphic representation made up of concepts linked hierarchically and significantly to each other. They are means for externalizing our internal knowledge structure of a given domain or topic or a text.

2.5 Forms of the concept map

Staley (2002) provided a good account of the different forms of concept maps, arranging them from the simplest to the most complex. We will present these visualizations and accentuate hierarchical maps because of their relevance to our research.

The simplest maps in this category are chart maps in which concepts appear in a linear sequence standing for a sentence. However in Systems map, concepts form a process or a cycle, with inputs and outputs in the system.

Landscape map is another form of concept map which visualizes concepts in a form of physical terrain and representative symbols .Landscape map then is a metaphorical space upon which concepts are arranged.

Another concept map is the three-dimentional map in which concepts have more complex syntactic connections, because the abstract space has been expanded. Mandala map arranges concepts in an abstract geometric pattern, often in a cycle.

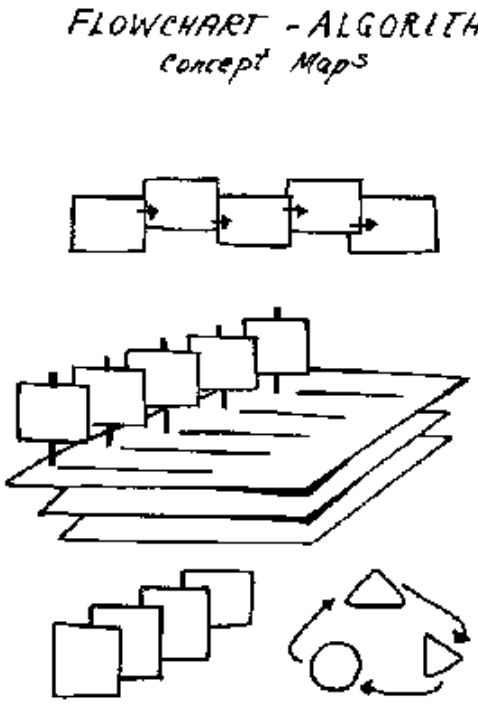


Fig2.1. Flowchart-Algorithm

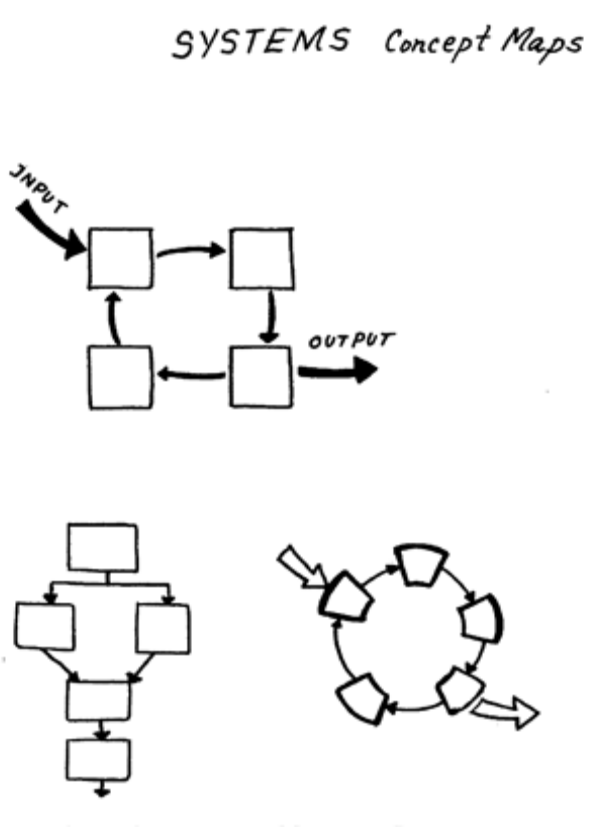


Fig2.2.Systems maps

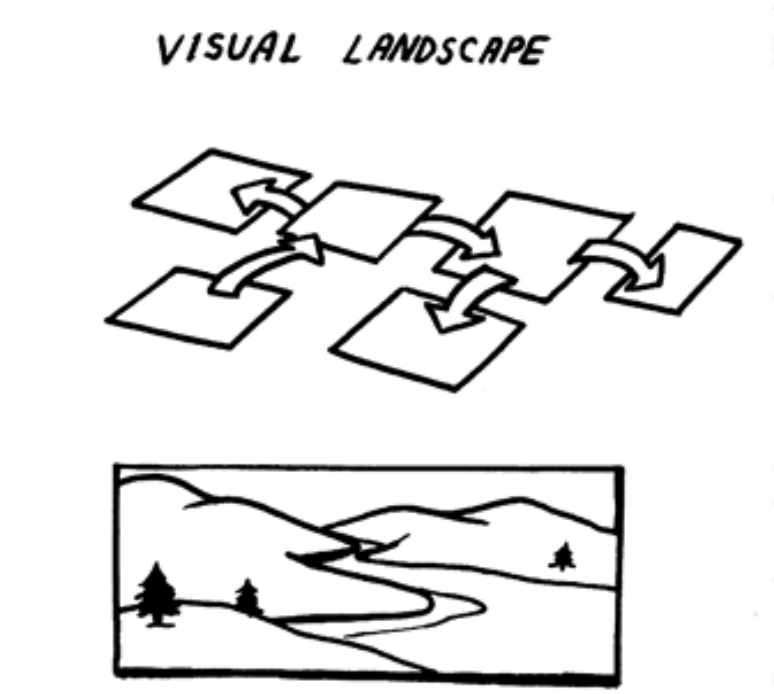


Fig 2.3.Visual landscape

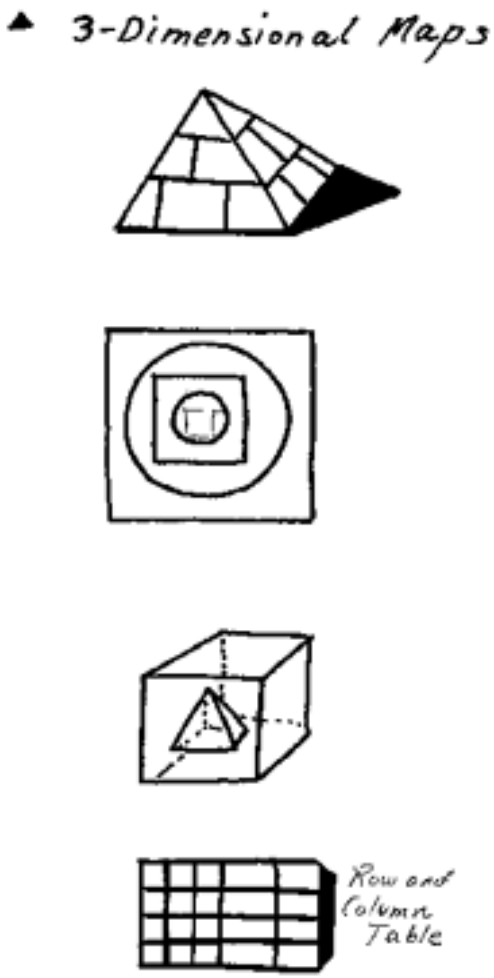


Fig2.4 Dimensional maps

In Spider map there is one or two central concepts out of which propositions radiates. Hanf (1971) and Buzan (1974) were the first to use them as a tool for note taking, summary and reading, instead of linear traditional note. They claimed that they develop reasoning competence and foster retention, alleviate activation of information and develop efficiency through eliminating steps in reading.

Hierarchical maps were developed by Novak (1984) and Dansereau and Lambiotte (1989).Though Buzan (1974) and Hanf (1971) were the firsts to consider using concept map in educational domain, Novak and Dansereau hierarchical maps were more popular. This is

mainly because hierarchical maps are well-organized as concepts are contained within geometrical shapes and connected with arrows, which make them easy to understand.

2.6 Concept Mapping as a Metacognitive Tool for Conceptual Knowledge Acquisition

2.6.1What is metacognition?

2.6.1. (a) The origin of the term

The term metacognition (cognition about cognition hence metacognition) was coined by Flavell (1976), a developmental, a developmental psychologist, in 1970's to mean:

> One's knowledge concerning one's own cognitive processes and products or anything related to them ... [and] refers, among other things, to the active monitoring and consequent regulation and orchestration of these processe..., usually in the service of some concrete goal or objective. (p. 232)

However, ideas of metacognition have already existed in works of early 20th century psychologists. James (1950) spoke about metacogitation when he said "introspective observation is what we have to rely on first and foremost and always." (James, 1950, p185).Piaget *reflected abstractions* point out to the fourth level of child development (from twelve on) where "the cognisance begins to be extended in a reflexion of the thought on itself" (Piaget, 1974/1976, pp.352-353)

2.6.1. (b) Basic concepts in metacognition

Metacognitive monitoring and control

Flavell's (1976) definition aforementioned points out to two important phenomena: metacognitive monitoring and metacognitive control.

> metacognitive monitoring is those processes that allow the individual to observe ,reflect on, or experience his or her own cognitive processes…Metacognitive control is the conscious and non-conscious decisions that we make based on the input of our monitoring processes. Control processes are revealed by the behaviours a person engages in as a function of monitoring. (Schwartz, 2002, p.4)

For example, you are solving a problem in mathematics and you know that you can't do it but you still carry on the task. Another example is that one can opt to use resort as memory prompt to recall a given list of items.

Metacognition, awareness and consciousness

Trying to define metacognition, scholars have used two of the most controversial words in philosophy of mind, i.e., awareness and consciousness. For example, Schwartz (2002) says that "Metacognitive awareness refers to the feelings and experiences we have when we engage in cognitive processes" *(2002, p5).* Nelson (1992) defined metacognition as 'A part of self-consciousness that deals with knowledge of one's mental states… and includes an ongoing perception of one's inner reality'. Herne (2000) said "metacognition is about being aware of our thinking" (p.19).

These two ubiquitous terms entail distinction before dealing with them in respect to metacognition. Some researchers have used them interchangeably to refer to

> what Dimond (1976) called 'the running span of subjective experience' -ongoing monitoring of subjective mental activities. With respect to memory, an 'aware' or 'conscious' expression of memory is characterized by a phenomenal quality of Jamesian 'pastness' (James, 1890; Tulving, 1985); that is, a subjective sense that a particular mental content represents an episode or episodes from one's personal past. (L. Schacter ,1991)

Others have endeavoured differentiating them but still maintained they are correlated. Forman (1998) argued that

> consciousness is the feature of experience that is cognizant when we are intentionally[4] Aware of something and the term awareness is the facet of consciousness that is aware within itself and may persist even without intentional content. (p.59)

Bower (1995) spoke about unconsciousness or perception without noticing, first order consciousness and second order consciousness. Perception without noticing corresponds to the inability of a person to speak about some proposition or to communicate it intentionally first order consciousness is the ability of an individual to talk about or acknowledge a proposition he has undertaken, which equates Farthing's(1992) phenomenal awareness and Rosenthal's(1993) transitive consciousness .Second order consciousness corresponds to individual beliefs and theories about the noticed information, which equates Rosenthal's (1993) state consciousness and Farthing's (1992) reflective awareness. Farthing (1992) used phenomenal awareness to refer to the first order thought and reflective awareness to the second order thought.

Rosenthal (2000) pointed out that "Metacognition functioning is plainly relevant to consciousness" (p.265).His first argument was the feeling of knowing judgments an individual make about their knowledge even in case it is not accessible to consciousness. For example, suppose you ask someone, being watching a playwright performance in theatre about characters' names; he might answer the question but his judgment about their

[4] Intentionality: phenomenological sense which should not be confused with the more familiar sense.Rather, intentionality is a generic term for the pointing-beyond-itself proper to consciousness (from the Latin intendere, which once referred to drawing a bow and aiming at a target. E.g. in a young, the pointing gesture is intentional, in the sense that it draws attention of the adult (the mother, usually) to the object desired or needed. An 'intentional content' is what we intend or signify through a talk or writing. In a phenomenological sense ,it is what we want people , a person ,to understand or interpret in a declaration ,description or explanation (H.SAADI,personal communication,March,2008)

confidence towards its correctness differs from one individual to another. This is the feeling they experience while reflecting on their cognitive endeavour. His second argument was subjects' judgment about their learning success (Judgment-of-learning JOL). "The metacognitive processes involved in both kinds of case result in subjects' conscious appraisals of their own cognitive condition" (p.265).Thus metacognition involves a second order consciousness which is labelled metacognitive monitoring. (Jarman ,Vavrik , and Walton 1995 as cited by Lane 2001)

Metacognition vs cognition

One baffling problem is to know what is cognitive and what is metacognitive. For Hacker (1998) "the former involves knowledge of the world and strategies for using that knowledge to solve problems, whereas the latter concerns monitoring, controlling one's knowledge and strategies".

However, Nelson (1999) argued that

> Metacognition is more of a subset of cognition than something other than cognition…if one aspect of cognition is monitoring or controlling another aspect of cognition, then the former aspect is metacognitive in relation to the latter aspect. (p. 625)

On this basis, Nelson (1990) divided the cognitive process into two or more intertwined levels called metalevels and object levels. The relation between them is that of dominance defined in terms of the flow of information. There are two dominance relations: control and monitoring. In the former relation, "the information flowing from the meta-level to the object-level either changes the state of the object-level process or changes the object-level".In the latter relation, 'the metalevel is informed by the object level .This changes the state of the meta-level's model of the situation, including "no change in state".'(Nelson 1990, p127)

2.6.1.(c) Flavell Metacognitive Model

Metacognitive models have appeared to describe the flow of information outside and inside mental structures, with an emphasis on the role of executive control in this process (Hacker, 1998). We will shed some light on one of these influential model which is Flavell's model.

Flavell (as cited by hacker, 1998) presented a model of metacognition, and cognitive monitoring in his important paper *Metacognition and Cognitive Monitoring: A New Area of Cognitive-Developmental Inquiry* (1979). He stated that person's ability to control

> a wide variety of cognition enterprises occurs through the actions and interactions among four classes of phenomena(a)metacognitive knowledge,(b) metacognitive experience,(c)goals(or task),and (d) actions(or strategies).Metacognitive knowledge is one's acquired world knowledge about "people as cognitive process creatures and with their diverse cognitive tasks, goals, actions ,and experiences (p.906 as quoted by hacker).

The goals or tasks refer to the actual objectives of a cognitive endeavour, such as reading and understanding. Actions or strategies are the techniques that allow achieving such goals (using brain storming before writing a text). Metacognitive experience is a cognitive or affective experience that accompanies cognitive endeavour, goals or tasks. The model is valuable as it defines metacognitive knowledge and describes the different factors influencing metacognition.

2.6.2 Research on Metacognition:

There has been an outburst of research on metacognition as it has become necessary to classify them. Among the classifications proposed is that of Hacker (1998). He distinguished four categories: research on cognitive monitoring, research on cognitive regulation, research on regulation and monitoring, and research examining metacognition in education.

The first category is interested in people's knowledge about their cognition. Among the phenomena they examined are tips of the tongue ,feeling-of- knowing (FON) judgment, serial recall ,allocation of study effort, *seen* judgments, judgments of learning (JOL) , and ease-of-learning judgments (EOL) .

Other researches focused on "regulation of one's own thinking processes in order to cope with changing situational demands" (Kluwe, 1982, p.210 as quoted by hacker 1998).Participants are instructed a strategy to perform a given task, for example free recall, then are assigned a transfer task to examine whether they use the strategy instructed, modify it or use another . Examples of such researches are studies carried by Brown and Campione(1977) (as cited by Hacker ,1998) on mentally educably retarded children and those by Lodico , Ghatala ,Levin, Pressley ,and Bell (1983) (as cited by Hacker,1998).

The third category inquired into how people monitor available information during the course of their own thinking and the use this information to regulate subsequent memory processes (kluwe, 1982; Schoenfeld, 1987 as cited by Hacker,1998).Hacker(1998) further distinguished two subcategories under this category .He said that there are studies which assess sort recall ,where people are required to reflect on their processing of provided list of items(words, pictures) and realize that using sorting as strategy can enhance recall. In the second subcategory, people are trained to master a set of strategies and asked to select the most effective for carrying a given task.

Hacker (1998) spoke about a growing body of research interested in ways in which metacognition theory can be applied to education. He stated that many researchers in this category have voiced the relevance of metacognition to education. Borkowski and Muthukrishna(1992) argued that metacognitive theory has "considerable potential for aiding teachers as they strive to construct classroom environments that focus on strategic learning that is both flexible and creative"(p.479) .Paris and Winograd (1990) said that

> students can enhance their learning by becoming aware of their own thinking as then read ,write, and solve problems in school. Teachers can promote this awareness directly by informing students about effective problem-solving strategies and discussing cognitive and motivational characteristics of thinking. (p.15)

These researches cover the different domains of education: writing, reading, comprehension, and problem solving to name only few. Our focus is on learning information from texts through making, organizing and using an instructional design called the concept map.

2.7 The Concept Map as a Metcognitive Instructional Tool

When Novak first presented the concept map to the education community it was to improve instruction by helping students become autonomous learners when they reflect on their knowledge and the way they acquire it (Novak 1984) as they strive making connection between their existing and prior knowledge through spatial visual representation , learners become aware that organizing and making connection between concepts help to enhance learning .They also engage in *control* process of planning monitoring progress and evaluating goal attainment as the map is constructed .

2.8 The uses of the concept map in translation

The concept map has been used disparately at the different phases of translation. De Beaugrande (1984), Gile (1990), Dancette (1995), and Nguyen (1998) are among those translation scientists who have showed a considerable interest in this kind of graphical representation.

At first, De Beaugrande (as cited by Nguyen, 1998) utilized the concept map to model the textual worlds of the reader and the writer. This was in the context of his study on the translation of poetry. He deduced that students are akin to link the concepts to one another so

as to remember them. De Beaugrand (1984) semantic network is over detailed as it schematizes the microstructural elements of the text and hence is intractable to draw for longer texts.

However, his study is valuable as it accounts for the comprehension and the production process of the readers through contrasting their recall to the model of the textual world. De Beaugrande (as cited by Nguyen, 1998) revealed that the translator doesn't maintain the whole texts elements, but only those which they are able to link to each other to achieve coherence rather than being faithful to the source text .Moreover, he found inference nodes, when examining the configuration of participant's recall.

The model was criticized, for it cannot provide a definition for the concepts. It doesn't account for the illustrations (i.e. images and figures and to the changes in the textual world which may occur while reading). Furthermore, it doesn't encompass our experience world which is relatively important in shaping our understanding (Nguyen, 1998).

Similarly Daniel Gile (1990) used the semantic network representation to model the translator's comprehension but for specialized statements. Gile (1990) draw our attention to the phenomenon of pseudo-comprehension, experienced by every translator, who finds the text easily understandable, when read *diagonally* before accepting it to know the difficulties it raises. He also noticed that this phenomenon reaches its high bulk when the buddy translators are in question.

Moreover, He argued that comprehension is tightly related to the receptor's 'functional needs'. To illustrate his stand, he narrated an anecdote in which he said that he was involved, as an interpreter, in a sport conference, in which a measurement device was presented by a company. The speaker on behalf of this company made sure whether the message was transmitted or not by asking the delegates about their understanding via the interpretation. The sport delegates answered by saying yes, oppositely, delegates representing another company

which industrializes the same product answered negatively. The formers were solely interested with the administrative and physical aspect the device; in contrast, the latter were engrossed with its technical side. The translation was ambiguous and some passages were hard to grasp.

In addition to the factor of functional needs, there is first that of lexical familiarity.Experiences carried out by Gile (1990) demonstrated that simple sentences which use complex or technical words are seemingly more understandable than sentences expressing complexe thought, though made up of familiar words. The second one is that sentence length and structure complexity of the sentence, which Gile considered as being les influential than the former.

Besides the aforementioned factors, Gile (1990) introduced the factor he labelled “le seuil du confort” which is related to psychological and sociological criteria. The reader is acquainted with to a certain level of understanding as it is the case for person leaving abroad for a long time and affirming understanding perfectly the Japanese though not.

Gile (1990) stressed the importance of extralinguistic knowledge in the translator’s understanding of the text, as when missed they result in language ambiguity and non mastery of specialized statement, what is relevant to our study is his model of the comprehension of specialized statements in which he made use of the concept map. According to this model the highly specialized statement are like non specialized statements, made up of logical or functional structures. This means that they contain nominal entities (substantive or nominal groups) determined by functional attributes (qualification, declaration of the existence or non-existence…etc.) and linked with functional and logical relationship (comparison, causality ….etc) .The links and attributes are rendered through adjectives and verbs or tool-words which are also present in non specialized discourse. In addition to representing the

comprehension of specialized statement, the model is valuable in analysing translation errors Figure 2.6 represents Gile's model (1990) of the sentence

'Programmable function keys make work easier.'

Where *function* is a nominal entity determined through programmable and linked to another nominal entity work easier, made up of an attribute easier and the nominal entity work, through a causal link. The translator may interpret the sentence wrongly if he, for example, translates it

Le travail est rendu plus facile par des clés dont les fonctions sont programmables.

The translator has misunderstood "funtion key" and "programmable" as depicted in figure 2

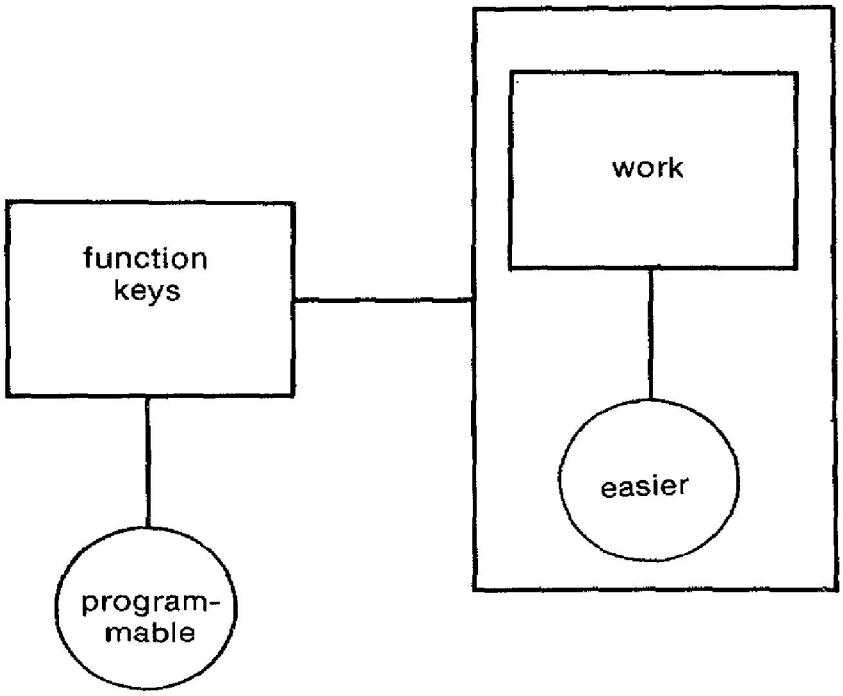


Figure 2.5 Network model of the sentence:

Programmable function keys make work easier (Gile, 1990, p28)

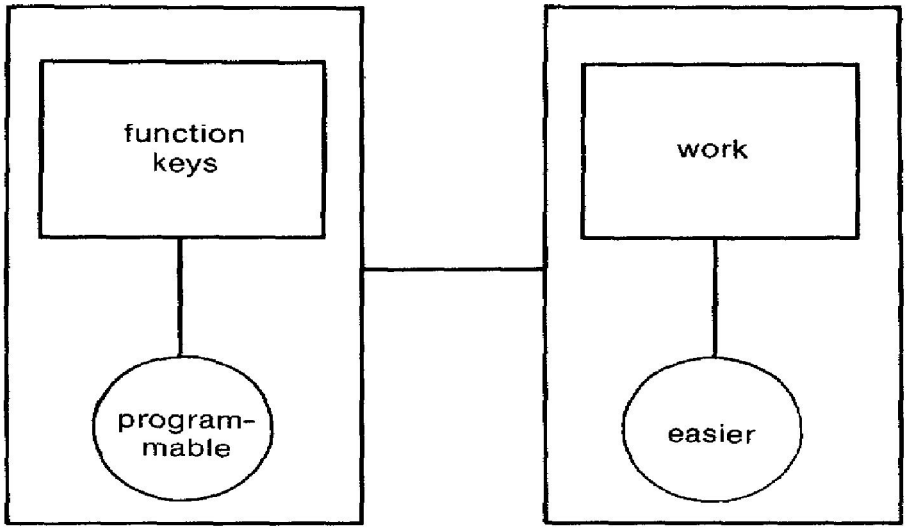


Fig 2.6 Another possible interpretation of the sentence (Gile, 1990, p28)

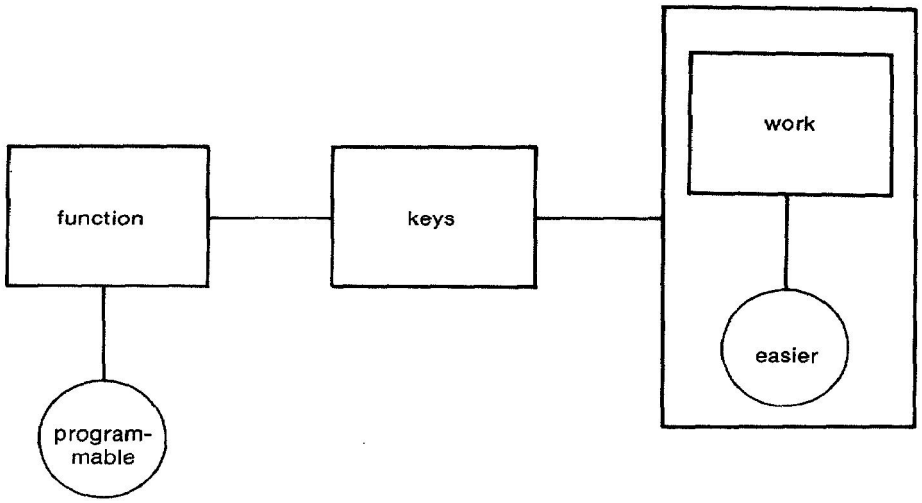


Fig 2.7 Erroneous comprehension model of the sentence

Programmable function keys make work easier (Gile, 1990, p29)

Gile's model (1990) is valuable as it gives insights into translation errors. It is a good way to assess translation at the conceptual and not the linguistic one.

However, Nguyen (2001) was the first to apply the concept map to the processes of comprehension and oral productions in consecutive translation. He carried out an experiment on third and fourth year students of translation where he compared between the impact of both the summary and the concept map on interpretation using informative discourses. He analyzed the data relying on psycholinguistic discourse analysis methods. He came to the conclusion that the concept is promising for translation teaching and learning.

Dancette (2005), on the other hand, hypothesised that the concept map can be used in translation didactics to elevate the student to the rank of the expert. For her, the concept map is an efficacious means to maximize and structure knowledge and information dealt with in the text. It can be used at each step in the translation process: reading and writing. Our research is deeply rooted in this idea .We advance the effectiveness of this tool in the teaching of the translation of specialized medical text.

CHAPTER THREE: THE EXPERIMENT

The Experiment

3.1 Methodology

We put forward the hypothesis that the concept map enhances the student's translation quality by fostering the extra-linguistic sub-competence .It acts as a metacognitive tool making the students aware of the conceptual integration process when reading a text. This process occurs if the individual organizes knowledge hierarchically.

This chapter is devoted to the experiment we carried out to test the aforementioned hypothesis .It is divided into two sections. The first section deals with the experiment, population choice, experimentation procedure, methods of data collection and data analysis.The second section tackles the results and their interpretation.

3.1.1 Population and sampling

The sample we picked up for the experiment is from third year translation students of Mentouri Constantine University because they are at the professional level unlike first and second year students ,whose linguistic level is still unimproved. We have never taught fourth year students; hence we don't have enough knowledge about their curricular that is why they were not selected for the experiment. The total number of third year students in this department is 359: 0.77% female and 0.23% male.

Sampling

We have chosen two groups randomly out of eight groups (n°6and n°8) .Group 6 (group A) contains 38 students: 24 females and 14 males; group8 (group B) contains 50 students: 12 males and 38 females .However, only 36 students from each group have participated in the experiment: 12 males and 24 females. Both groups were then requested to

translate texts using two different tools. The first sample (group A) used the technique of text analysis meanwhile the second sample (group B) employed the concept map tool.

3.1.2 Pilot Experiment

A pilot experiment has been administered to both groups to test the research instruments, in the translation department of Constantine University. The students were asked to translate two texts: text A which is about haemopoiesis and text B which concerns erythrocytes .The first text was translated in April the 8th and the second in April the 9th, 2008.

Group A, the experimental group, who has received training on how to construct the concept map for a period of 5 weeks (see section 3.2.3 (b)), were asked to translate texts by drawing first their concept map. On the other hand, Group B were requested to use the text analysis technique in their translation (c.f 3.2:analysis of the results)

The obtained results reveal that the concept map is a good tool to check as the translations of the experimental group were better than those of the control group (see section 3.2).

3.1.3 The main experiment

3.1.3. (a) The site of the experiment

The experiment was carried out in a classroom in the department of translation of Constantine University, on April 22, 2008. The same groups, who participated in the pilot study, have joined the main experiment and text A was kept, and therefore the students were not asked to translate text A .We chose this department because we teach there, a position which makes us into direct contact with subjects; we have enough information about their translation curricular and also about their psychological state.

3.1.3. (b) Training students to the use of the concept map:

Before the pilot and the main experiments were carried out, the students had been introduced to the concept map and trained to construct it for a period of 7 weeks. No training was provided for the technique of text analysis because students know it. We have relied on Novak strategies directed at fourth grade students with slight modifications. Here are the steps we have followed:

1- Students were displayed two lists of words: a list of familiar words (Table 3.1.1) for objects and another list for events. They were asked then to report the difference between the two lists, and then the list is labelled

Pen	**Breathing**
Brain	**Revolution**
Liver	**Metabolism**
Blackboard	**Bleeding**
Cell	**Excretion**
Toe	**Reading**
Bed	**Aging**
Bone	**Birthday party**
Toy	**Circulation**

Table 3.1.1 objects and event list

2-Student were asked to think about what they think of when they hear such words as house, bird, mother .The point is that the students realize that we have different images of objects we see and these images are called concepts.

3-The same thing was done with events. The students reflect on events for example: working, travelling, and again they were made known that these are concepts too.

4- They were shown a list of words, such as, *while, meanwhile, then, however, is* and asked to say what they think of at the moment of hearing them. These are linking words and not concepts and are used to construct sentences.

5-Participants were informed about the difference between labels for regularities in events or objects and those for specific events or objects (proper nouns).

6-Two concepts were used to construct a sentence like *the earth is a planet*.

7-Subjects were asked to construct sentences of there own, which are later broken down into concepts and linking words.

8-Words from two different languages were provided to demonstrate that language doesn't make the concept, but only serves as a label.

9- The subjects read a paragraph and identify key concept words. The concepts were noted down on the board, and then the students were told to classify them from the most general to the most inclusive according to the text.

10-The experimenter started drawing the concept map using the rank order list. The participants helped in choosing the linking words.

11-The students were warned not to place more than four concepts under any other concept. They have to construct another level of hierarchy whenever they find more than four concepts under one inclusive concept. This means that they can find another general concept under which they rank particular concepts.

12-The participant should know that most first effort maps have poor symmetry or some concept clusters poorly located relative to other more closely related concepts and need to be reconstructed.

13-The students look for crosslinks between concepts in different sections of the map and label these lines.

14-The students were informed that there is no one way to draw a map. The concept map reflects their understanding of the text, and this understanding differs from one individual to another, and also in different conditions for the same individual.

15- The scoring criteria of the concept map in Novak's table of scoring were discussed, then the newly constructed map is scored, and students were shown how they can improve their score.

Prepositions. Is the meaning relationship between two concepts indicated by the connecting line and linking word(s)? Is the relationship valid? For each meaningful, valid proposition shown, score 1 point.
Hierarchy. Does the map show hierarchy? Is each subordinate concept more specific and less general than the concept drawn above it (in the context of the material being mapped? Score 5 points for each valid level of the hierarchy.
Examples: Specific events or objects that are valid instances of those designated by the concept label can be scored 1 point each. (These are not circled because they are not concepts.)
In addition, a criterion concept map may be constructed, and scored, for material to be mapped, and the student scores divided by the criterion map score to give a percentage for comparison. (Some students may do better than the criterion and receive more than 100% on this basis).

Table 3.1.2 Scoring criteria for concept maps (Novak 1984, p 36)

16-Participants worked in twos or threes to construct the concept map of a section of a text entitled “A shade of difference”.

17-The maps constructed were displayed to the whole participants. Reading the map should make clear to other students in the class what the text is about as interpreted by the map maker.

After the students were trained to concept map construction, the experiment could be performed. It comprises two steps which are as follows:

The first step

The first test took place on April the 8th 2008 in a classroom in the translation department. Both groups were given a copy of a medical (informative) text of four paragraphs to be translated with the help of the experimenter. Group A used the technique of text analysis and group B the concept map technique.

1- The experimenter told students first in what way the test is relevant to their study. He said to them that he experiments a new technique which may make them better future translators. The point is to make the students involved.

2- Each individual was given a paper containing the text and the corresponding questions. They were also given a list of terms, their signification and their equivalent in Arabic.

3- Group A were first requested to answer the question and then translate the text. We used Nord (1988/2005) method of text analysis for translation. Group B were requested to answer the same questions, except for the questions about topic sentences and the lexical field, and to construct the concept map.

4- The role of the experimenter was to guide the students to give the solutions .He might intervene whenever there was ambiguity for students.

The second step

On April 22, 2008, the students were given another text which content is related to the first one.

1- Copies of the second text were distributed.

2- As done for the first text, Group A were invited to answer question about the text and then to translate it. Group B were requested to answer the same questions except the questions about topic sentences and the lexical field, and then to draw the concept map and translate it.

3- The experimenter intervened in case students had questions about the new concepts because they were supposed to know concepts related to the previous text.

3.1.4Method of data collection
The texts

There are a large number of medical text genres: from research articles published in highly specialized journals, to clinical guides for physicians, text books for university students, patient information brochures, press releases, and TV documentaries about health.

The present texts are extracts from a textbook directed at university students of medicine. Textbooks are one of medical genres. Two groups of sub genre are identified under this category. One group is concerned with the science of medicine, e.g., dermatology, and the other deals with clinical topics. The formers provide beginners with the essentials of medicine and the latter is directed at advanced learners and medical practitioners, supplying information about practice. Scientific textbook present the research aspect of medicine, and clinical textbooks the praxis one.

The content

The textbooks the texts are extracted from are respectively entitled *Medical laboratory Haematology 1984* and *Haematology at Glance 2005* .They are about haematology, "the study of the normal and pathologic aspects of blood and blood elements." (Schmaier, 2003). In other words, it is the study of blood diseases. These textbooks combine physiology, pathophysiology and the practical aspect of haematology.

The texts are descriptive and loaded with specialized medical terms because the aim of this dissertation is to alleviate the student's translation of specialist medical texts .The first text (text A) presents the different components of blood. The second text (text B) provides information about the development of erythrocytes. The third text (text C) speaks about the development of progenitor red cells.

3.1.5 Method of data analysis

3.1.5 (a) Propositionalization

Data analysis should be on the conceptual level because we are dealing with the conceptual integration. To serve this purpose, we will use propositions which are, according to J.R.Anderson (1981),

> 'composed from various configurations of the concepts. They are not arbitrary configurations, but have certain well-formedness constraints that derive from the logical notion of a proposition. That is, they are taken to be the smallest units of meaning that assert things about the world that might be reasonably judged true or false. Propositions have a "syntax" which can be used to determine what they assert about the world'. (p.124)

Proposition are used instead of plain language mainly because of two reasons. Firstly, because unlike plain language, they have a unique function which is the representation of

meaning .Secondly, they have proven to be useful for scoring text comprehension (kinstch, 1998).

The text has a microstructure and a macrostructure. The former is the local structure of the text, which is made up of micropropositions. The micropropositions are sentence to sentence information.

The latter stands for the global structure of the text and is made up of macropropositions, which provide for the organization of micropropositions and are related to them according to macrorules .They are the gist of the text.

In this experiment the words represent the concepts and sentences the propositions; words and sentences are ways to represents abstract entities (i.e. they are means for verbalization of reality about the world).

Propositional rules

We will be using Kinstch's (1998) propositional rules to break down the text into propositions. Kinstch (1998) devised three rules for frequently encountered propositional constructions .We will explain them keeping the same examples he had provided.

Verbs as predicates

The verb determines the argument and may form complex propositions. It is usually not necessary to indicate the case role of an argument.

- *The haemoglobin carries oxygen.*
- CARRY [HEMOGLOBIN, OXYGEN]

Prepositions indicate the case role of arguments and may be included in a proposition for clarification:

- *The blood from the body arrives at the atrium through the veins.*
- ARRIVE[BLOOD,FROM-BODY,AT-ATRIUM,THROUGH-VEINS]

The first chamber is the right atrium.

- IS[FIRST[CHAMBER],RIGHT[ATRIUM]]

A sentence complement can be expressed as argument of superordinate proposition:

- *Purplish blood tends to lack oxygen.*
- TEND[PURPLISH[BLOOD] ,LACK[PURPLISH[BLOOD] ,OXYGEN]]

Propositions as arguments

One atomic proposition can be contained into another complex proposition to serve as an argument. For example,

- *The blood arrives at the right atrium.*
- ARRIVE [BLOOD, RIGHT [ATRIUM]
- *The first chamber is the right atrium.*
- IS [FIRST [CHAMBER], RIGHT [ATRIUM]]

A sentence complement can work as an argument for another complex proposition.

- *Purplish blood tends to lack oxygen.*
- TEND [PURPLISH [BLOOD], LACK [PURPLISH [BLOOD],OXIGEN]]

Relative clauses are treated as atomic propositions and are attributed to a modifier slot in a superordinate proposition

- *Blood that has been drained of oxygen arrives at the right atrium.*
- ARRIVE [BLOOD], RIGHT [ATRIUM]]

DRAIN [BLOOD, OF-OXYGEN]

Modals act as modifiers in complex propositions.

- *Heart attacks may be fatal.*
- POSSIBLE [FATAL [HEART ATTACK]

Modification

Adjectives and adverbs functions as predicates of atomic propositions:

- *Septial defect*
- SEPTIAL [DEFECT]

The blood returns to the heart quickly

QUICK [RETURN [BLOOD, HEART]]

Table 3.1.3 The micropropositions of text A

1) P1= The blood of normal adult accounts approximately 7% ml.kg
2) P2= 30 ml of blood is occupied by cellular elements
3) P3= 45% of blood is occupied by cellular elements
4) P4= 40ml of blood is plasma
5) P5= 55% of blood is plasma
6) P6= The cells are heterogeneous
7) P7= Cells consists of erythrocytes
8) P8= Erythrocytes are disk shaped
9) P9= Erythrocytes are non-nucleated
10) P10= Erythrocyte are non-motile
11) P11= Cells contain haemoglobin
12) P12= Cells contain leucocytes
13) P13= Leucocytes are nucleated
14) P14= Leucocytes are motile
15) P15= Cells contain platelets
16) P16= The leucocytes are divided into granulocytes
17) P17= Granulocytes comprise neutrophils

18) P18= Granulocytes comprise eosinophils

19) P19= Granulocytes comprise basophils

20) P20= Leucocytes are further divided into lymphocytes and monocytes

21) P21= Plasma contains many organic compounds

22) P22= Plasma contains many non-organic compounds

23) P23= Plasma contain notably proteins

24) P24= Plasma contain notably electrolytes

25) P25= Plasma contain notably substances

26) P26= gastrointestinal tract absorb substances

27) P27= Plasma contains notably hormones

28) P28= Plasma contains notably metabolism products

29) P29= Blood cells have a finite life span

30) P30= Disease shorten life span

31) P31= Plasma components have a determined turnover rate

32) P32= Particularly proteins have a determined turnover rate

33) P33= The turnover rate is often expressed in as 1/2T

34) P34= T1/2 is the time during which half the substance is removed from the circulation

35) P35= Half the substance is renewed in health

36) P36= Disease may alter the turnover times

37) P37= Cells are lost through the normal process of ageing

38) P38= Cells are lost through the physiological consumption

39) P39= Cells are lost through the loss from the body in certain circumstances

40) P40= The cell loss is compensated through the process of renewal

41) P41= The process of renewal consists of proliferation

42) P42= The process of renewal consists of maturation

43) P43= The process of renewal consists of the release of new cells

44) P44= Haemopoietic system releases cells P1

45) P45= Haemopoiesis refer to P1

46) P46= Adult haemopietic system consists of the bone marrow

47) P47= Adult lymphatic system consists of the lymphatic system.

48) P48= Other haemopesis sites are active in the embryo

49) P49= Other haemopesis sites are active in foetus.

Here are the micropropositions of the pilot text. It is a long text that is why we have obtained 36 microprosition. It was replaced by Text C which is shorter for the sake of analysis.

Table 3.1.4 micropropositions of Text B

1. P1= the mean cell life of red cell is 120 days.
2. P2= during 120 days red cells travel 175 miles.
3. P3=less than 1% of red cells are the newly formed reticulocytes.
4. P4= the newly formed reticulocytes are released from the bone marrow.
5. P5= the newly formed reticulocytes take 1-2 days to develop
6. P6= the newly formed reticulocytes develop into mature red cells.
7. P7= It is a simple calculation.
8. P8= approximately 2x10 of red cells are destroyed each day in 70 kg subject.
9. P9= approximately 2x10 of red cells are replaced each day in 70 kg subject
10. P10= incredible 2.3x10 per second of red cells is destroyed in 70kg subject.

11. P11= incredible 2.3x10 per second of red cells is replaced in 70kg subject.
12. P12= the mature red cell is circular.
13. P13= the mature red cell is biconcave.
14. P14= the mature red cell is discoid.
15. P15= the average diameter of mature red cell is 8.4 μm in wet preparations.
16. P16= the average diameter of mature red cell is 7.2-7.4 μm in fixed dried blood films.
17. P17= the mature red cell measures 2.4 μm at its thickest point.
18. P18= the mature red cells measures 1μm at the biconcavity.
19. P19= the approximate surface area of the mature red cells is 140 μm^2.
20. P20= the total surface area of the circulating red cells is variously quoted as 1500-2000 times the surface area of the body.
21. P21= the average (±2sd) volume (mcv)of red cells is 88±6ft.
22. P22= red cells are readily deformable.
23. P23= red cells pass through the smallest blood capillaries.
24. P24= red cells pass through cell junctions.
25. P25= enables P21, P22.
26. P26= enables P21, P23.
27. P27= red cells can be drawn 3 μm through capillaries.
28. P28= red cells can be drawn 3 μm through micropore filter.
29. P29= red cells regain normal shape.
30. P30= red cells withstand swelling.
31. P31= P29 is not matched with P30.
32. P32= P30 increase cell volume about 10%.
33. P33= membrane loses its integrity.
34. P34= membrane releases cell content.

35. P35= before P33, P32.

36. P36= before P34, P32.

Table 3.1.5 The translation of the microproposition of text B

1. متوسط عمر الخلايا الحمراء 120 يوما.
2. تسلك الخلايا الحمراء خلال حياتها حوالي 175 ميلا.
3. على العموم تشكل الخلايا الشبكية الحديثة التكوين تقريبا أقل من 1 من نسبة الخلايا الحمراء
4. يحرر النخاع العظمي الخلايا الشبكية.
5. تستغرق الخلايا الشبكية مدة تتراوح من يوم إلى يومين لتتطور,
6. تتطور الخلايا الشبكية المتكونة حديثا لتصبح خلايا حمراء ناضجة,
7. بعملية حسابية بسيطة.
8. يهدم ما يقارب 2 x 10 خلية حمراء في اليوم في جسم شخص يزن 70كغ.
9. يعوض ما يقارب 2x 10 خلية حمراء في اليوم في جسم شخص يزن 70كغ.
10. يهدم ما يقارب 2.3x 10 خلية حمراء في الثانية في جسم شخص يزن 70كغ.
11. يعوض ما يقارب2.3x 10 خلية حمراء في الثانية في جسم شخص يزن 70كغ.
12. كرية الدم الحمراء الناضجة دائرية الشكل .
13. كرية الدم الحمراء الناضجة مقعرة الوجهين.
14. كرية الدم الحمراء الناضجة قرصية الشكل.
15. متوسط قطر كرية الدم الحمراء الناضجة 8.4 ميكرومتر في المستحضرات المائية.
16. يعتبر P4 اكبر من متوسط طول قطر الخلية الحمراء الناضجة في الأشرطةالدموية الجافة المثبتة.
17. يبلغ قطر الخلية الحمراء الناضجة 2.4 µm أعلى نقطة كثافة لها.
18. يبلغ طول قطر الخلية الحمراء الناضجة 1 µm في الجهة المقعرة.
19. تقارب مساحة الخلية الحمراء 140µm².
20. تتباين الآراء حول المساحة الإجمالية للخلايا الحمراء التي تسري في الدم ما بين 1500 الى 2000 مرة ضعف مساحة الجسم.

21. متوسط (±sd2) حجم (mcv) الخلايا الحمراء 88±6ft .

22. شكل الكريات الحمراء قابل للتغيير بسهولة.

23. تمر الخلايا الحمراء من خلال الشعيرات الدموية الصغرى.

24. تمر الخلايا الحمراء من خلال الواصلات الخلوية.

25. تمكن P21من P22.

26. تمكن P21من P23.

27. يمكن أن يتقلص قطر الخلايا الحمراء الى 3 ميكرومتر خلال سحبها في الأنابيب الشعرية.

28. يمكن أن يتقلص قطر الخلايا الحمراء ليصبح 3 ميكرومتر خلال سحبها عبر مسامات المرشح.

29. تستعيد الخلايا الحمراء شكلها.

30. تقاوم الخلايا الحمراء الانتباج.

31. لا تتناسبP29 مع P30.

32. يبلغ الانتباج% 10 من حجم الخلية.

33. يفقد الغشاء كماله.

34. يحرر الغشاء مكونات الخلية.

35. قبل P32 P33.

36. قبل P32 P34.

Text C is about stem cells. It contains 33 micropropositions, which are linked to text A. The following table represents these micropropositions.

Table 3.1.6 The micropropositions of text C

1. P1= common primitive stem cells are found in the marrow.
2. P2= common primitive stem cells self-replicate to increasingly specialized progenitor cells.
3. P3= common primitive stem cells proliferate to increasingly specialized progenitor stem cells.
4. P4= common primitive stem cells differentiate to increasingly specialized progenitor stem cells.
5. P5= progenitor stem cells undergo many divisions.
6. P6= specialized progenitor cells form mature cells.
7. P7= mature cells comprise red cells.
8. P8= mature cells comprise granulocytes.
9. P9= mature cells comprise monocytes.
10. P10= mature cells comprise lymphocytes.
11. P11= peripheral blood contains mature cells.
12. P12=the earliest recognizable red cells precursor is pronoblast.
13. P13= the earliest recognizable granulocytes precursor is myeloblast.
14. P14= the earliest recognizable monocyte precursor is myeloblast.
15. P15= an early lineage division is between lymphoid cells and myeloid cells.
16. P16= stem cells cannot be recognized morphologically.
17. P17= progenitor cells cannot be recognized morphologically.
18. P18= stem cells resemble lymphocyte.
19. P19= progenitor cells resemble lymphocyte.
20. P20= progenitor cells can be detected by *in vitro* assays.
21. P21= progenitor cells form colonies *in vitro* assays.

22. P22= progenitor cells circulate in the peripheral blood.

23. P23= stem cells circulate in the peripheral blood.

24. P24=the marrow contains stromal cells.

25. P25= stromal cells comprise fibroblast.

26. P26= stromal cells comprise endothelial cells.

27. P27= stromal cells comprise macrophage.

28. P28= stromal cells comprise fat cells.

29. P29= stromal cells have adhesion molecules.

30. P30= adhesion molecules react with the corresponding ligeand.

31. P31= the ligand is on stem cell.

32. P32= adhesion molecules maintain stem cells viability.

Table 3.1.7 The translation of the proposition of text C

1) الخلايا الجدعية العادية الأولية المتواجدة في النخاع.
2) تتضاعف الخلايا الجدعية العادية الأولية المتواجدة في النخاع لتصبح تدريجيا خلايا سلفية متخصصة.
3) تتكاثر الخلايا الجذعية العادية الأولية المتواجدة في النخاع لتصبح تدريجيا خلايا سلفية متخصصة .
4) تتمايز الخلايا الجذعية الأولية العادية لتصبح تدريجيا خلايا سلفية متخصصة.
5) تنقسم الخلايا السلفية عدة انقسامات خلوية في النخاع.
6) تكون الخلايا السلفية المتخصصة الخلايا الناضجة.
7) تحوي الخلايا الناضجة الخلايا الحمراء.
8) تحوي الخلايا الناضجة الخلايا الحبيبية .
9) تحوي الخلايا الناضجة خلايا وحيدة .
10) تحوي الخلايا الناضجة الصفائح الدموية.
11) تحوي الخلايا الناضجة خلايا لمفاوية .

12) يحوي الدم المحيطي خلايا ناضجة .

13) أول ما يتعرف عليه من طلائع الحمراء طليعة الأرومة السوية.

14) أول ما يتعرف عليه من طلائع الخلايا الحبيبية هي الأرومة النخاعية.

15) أول ما يتعرف عليه من طلائع الخلايا الأحادية هي الأرومة النخاعية.

16) الانقسام المبكر بين السلالات الخلوية يكون بين الخلايا اللمفاوية و الخلايا النخاعية.

17) لا يمكن التعرف على الخلايا السلفية مرفولوجيا .

18) لايمكن التعرف على الخلايا الجذعية مورفولوجيا.

19) تشبه الخلايا الجذعية الخلايا اللمفاوية .

20) تشبه الخلايا السلفية الخلايا اللمفاوية .

21) يمكن الكشف عن الخلايا السلفية عن طريق المقايسة المخبرية.

22) تشكل الخلايا السلفية مستعمرات في المقايسة المخبرية.

23) تسري الخلايا الجذعية في الدم المحيطي.

24) تسري الخلايا السلفية في الدم المحيطي.

25) يحوي النخاع خلايا سدوية.

26) تتكون الخلايا السدوية من الأورمات اللفية.

27) تتكون الخلايا السوية من الخلايا البطانية.

28) تتكون الخلايا السدوية من البلاعم .

29) تتكون الخلايا السدوية من الخلايا الذهنية.

30) تحوي الخلايا السدوية جزيئات لاصقة .

31) تتفاعل الجزيئات اللاصقة مع اللجين المناسب.

32) يتواجد اللجين في الخلايا الجذعية.

33) الجزيئات اللاصقة تحافظ على حيوية الخلايا الجذعية.

3.1.5 (b) The assessment of propositions

For evaluating the propositions we followed Dussart (2005) and used his notions of incorrect translation, addition and omission .However we omitted the language and style errors because our focus is on conceptualization. Hence we avoided the triad of *sens*, *non sens* and *contre sens* which Dussart (2005) asserted is misleading and confusing, therefore it should be abandoned.

Omitted and partially omitted propositions:

The student may leave out the translation of a proposition or part of it for different reasons. He may forget it because he is distressed as he may do that intentionally because he misunderstands it. What follows are examples of partially omitted propositions.

P28: *Red cells can be drawn 3 µm through micropore filter*

يمكن أن يتقلص قطر الخلايا الحمراء ليصبح 3 ميكرومتر خلال سحبها عبر مسامات الصغيرة.

In this example the student didn't translate the word filter.

Addition

The subjects may add a proposition which doesn't belong to the text or only few concepts. The addition or over-translation results from student's will to illustrate words in the text but sometimes he fails doing that because of the misunderstanding of the proposition.

Eg:

P8: *Approximately 2.10 of red cells are destroyed each day in 70 kg subject*

في حالة شخص يزن 70كغ أي ما يقارب 2 .10 كرية دموية حمراء تدمر و تعوض كل يوم

The word أي was added to the previous proposition. It is a result of a misunderstanding

We notice the same mistake in a proposition translated by another subject as

نجد أن شخصا يزن 70كغ يحتوي على2.10 خلية حمراء والتي يتم هدمها

Incorrect proposition

The proposition can be transferred erroneously. This transfer can be totally or partially incorrect .This is mainly due to students' lack of language or extralinglistic knowledge.

When the transfer is partial, it means that the student didn't assimilate all concepts in the proposition, and that he doesn't link between concepts.

Eg:

P18- *The mature red cells measures 1*μm *at the biconcavity.*

يقدر قطر الخلية الحمراء الناضجة في المنطقة الدقيقة ب 1 μm

This participant does not have sufficient knowledge of English language as he doesn't know how to translate the word biconcavity which is not a specialist term.

P3 -*Less than 1% of red cells are the newly formed reticulocytes.*

P4 -*The newly formed reticulocytes are released from the bone marrow.*

P5 -*The newly formed reticulocytes develop into mature red cells.*

أقل من 1 من الخلايا الحمراء تتجدد على شكل خلايا شبكية من عظم نقي، (والذي يستغرق من يوم إلى يومين للتطور في الخلايا الناضجة)

This fault is due to deficiency in specialist knowledge. The subject doesn't know that there's a process of maturation for red cells, and that they are released from the bone marrow. He would have retained this information from text A but he failed.

P20 -*The total surface area of the circulating red cells is variously quoted as 1500-2000 times the surface area of the body.*

إن المساحة الإجمالية لدوران كريات الدم الحمراء قدرت بين 1500 و2000 مرة ضعف مساحة الجسد.

Connection

Producing correct propositions is not sufficient to infer that the student has successfully integrated texts concepts. What do we need to know is whether he has linked between these propositions. Vandij and kinstch (as cited by Kinstch, 1998) pointed out to three ways through which propositions can be linked: direct coherence, indirect coherence and subordination.

1. Indirect coherence propositions are directly coherent when they belong to the same episode which means the same time, place or argument[5]. For example:

تتميز الخلايا الجدعية للنخاع بقدرتها علي الاستنساخ و التكاثر و التمايز الداتي لتخرج اخيرا بخلايا مطابقة للخلايا الأم بعد التقسيم لعدة خلايا داخل النخاع

Actually it is the common pritimive cells which undergo the division. The last part of the sentence doesn't share the same argument

2. Direct coherence it is the same as indirect coherence but differs in the sense that the former can be depicted through separate clauses or sentences, sentence adverbials, compound sentences and explicit connectives.

[5] Argument overlapping is said to be two prepositions which share the same argument which may call for inference. For example knowing that the pronoun *they* refers to the word *cells*

Eg1:

لا نستطيع تشخيص الخلايا الجذعية و الخلايا السلفية هي تشبه الخلايا اللمفاوية يمكن إيجاد الخلايا السلف في الأنبوب أين تكون عبارة عن مستعمرات تسبح الخلايا الجذعية و الخلايا السلف في الدم المحيطي

Eg2:

يحصل تقسيم عرضي مبكر بين الخلايا اللمفاوية و النخاعية لا تعرف الخلايا الجذعية و السلفية مورفولوجيا لأنها تشبه اللمفاوية

These sentences should contain direct links which is the connector "و"

Eg3:

الخلايا الجذعية الأولية في النخاع لها القدرة علي ان تنسخ نفسها و تتكاثر و مختلف التكاثرات الخاصة بالخلايا السلفية , بعد العديد من الانقسامات الخلوية داخل النخاع

3. Subordination 'When one predicate-argument schema is taken as a specification of another (e.g., a condition), a complex sentence with a full embedded clause is typically used, represented propositionally as two underlying complex propositions. When only one aspect of a schema is specified rather than a whole clause, such as a specification of the manner of action or the property of a participant, restrictive relative clauses are used .Adjectivization signals an even more stronger degree of subordination (Kintsch ,1998)

There are a local and a global coherence. The local coherence is at the level of micropropositions and the global is related to macropropositions**.**

Incoherence can be detected through wrong propositions, errors in using transition signals, conjunctions and referents (anaphora, cataphora).We categorized errors according to whether they are indirect coherence errors, direct coherence errors and subordination coherence errors.

Macroproposition

Kintsch (1998) provided three rules of macro operation:

Selection: Given a sequence of propositions, propositions that are not an interpretation condition for another proposition maybe deleted.

Generalization: A proposition that is entailed by each sequence of propositions may be substituted for that sequence.

Construction: A proposition that is entailed by the joint set of a sequence of propositions may be substituted for that sequence.

Here are the macropropositions of text C

M1=P1 +P2+P3+P4+P5+P7 = Common primitive red cells develop into mature cells of the peripheral blood.

Through CONSTRUCTION

M2=P7+P8+P9+P10+P11=Peripheral blood mature cells

Through GENERALIZATION

M3=P12+P13+P14+P15 =Earliest recognizable blood cells precursor

Through GENERALIZATION

M4=P16+P17+P18+P19+P20+P21=Stem cells can be recognized in vitro assays

Through SELECTION

M5=P22+P23 =Peripheral blood myeloid cells
Through GENERALIZATION

M6=P24+P25+P26+P27+P28 =Marrow stromal cells
Through GENERALIZATION

M7=P29+P30+P31+P32 =Stromal cells react with stem cells

Through CONSTRUCTION

3.2 The analysis of research results

3.2.1The results of the pilot experiment

What follows are some results of the pilot experiment, which are encouraging.

Legend of the tables of the micropropositions scores	
C=correct microproposition	**I=incorrect microproposition**
Pc= partially correct microproposition	**O= omitted microproposition**
A= added microproposition	**%=percentage of students**
Po=partially omitted microproposition	

Type of error	C	I	Pc	O	po	A
%	86,11	0	0	0	13,88	0

Table3.2.1.1 Microproposition of the pilot experiment n°01 Groupe A

Type of error	C	I	Pc	O	Po	A
%	72,22	0	13,88	0	13,88	0

Table3.2.1.2 Microproposition of the pilot experiment n°01 Groupe B

Type of error	C	I	Pc	O	Po	A
%	94,44	5,55	0	0	0	0

Table3.2.1.3 Microproposition of the pilot experiment n°02 Groupe A

Type of error	C	I	Pc	O	Po	A
%	61,11	0	33,33	0	5,55	0

Table3.2.1.4 Microproposition of the pilot experiment n°02 Groupe B

Type of error	C	I	Pc	O	Po	A
%	55,55	33,33	5,55	5,55	0	0

Table3.2.1.5 Microproposition of the pilot experiment n°0 3 Groupe A

Type of error	C	I	Pc	O	Po	A
%	13,88	33,33	52,77	0	0	0

Table3.2.1.6 Microproposition of the pilot experiment n°03 Groupe B

Type of error	C	I	Pc	O	Po	A
%	86,11	13,88	0	0	0	0

Table3.2.1.7 Microproposition of the pilot experiment n°04 Groupe A

Type of error	C	I	Pc	O	Po	A
%	86,12	0	13,88	0	0	0

Table3.2.1.8 Microproposition of the pilot experiment n°04 Groupe B

Type of error	C	I	Pc	O	Po	A
%	66,66	5,55	27,77	0	0	0

Table3.2.1.9 Microproposition of the pilot experiment n°05 Groupe A

Type of error	C	I	Pc	O	Po	A
%	86,11	8,33	5,55	0	0	0

Table3.2.1.10 Microproposition of the pilot experiment n°05 Groupe B

Type of error	C	I	Pc	O	Po	A
%	66,66	19,44	13,88	0	0	0

Table3.2.1.11 Microproposition of the pilot experiment n°06 Groupe A

Type of error	C	I	Pc	O	Po	A
%	72,22	8,33	13,88	5,55	0	0

Table3.2.1.12 Microproposition of the pilot experiment n°06 Groupe B

Type of error	C	I	Pc	O	Po	A
%	94,44	5,55	0	0	0	0

Table3.2.1.13 Microproposition of the pilot experiment n°07 Groupe A

Type of error	C	I	Pc	O	Po	A
%	72,22	5,55	8,33	5,55	8,33	0

Table3.2.1.14 Microproposition of the pilot experiment n°07 Groupe B

Type of error	C	I	Pc	O	Po	A
%	66,66	13,88	13,88	0	0	5,55

Table3.2.1.15 Microproposition of the pilot experiment n°08 Groupe A

Type of error	C	I	Pc	O	Po	A
%	19,44	33,33	27,77	0	13,88	5,55

Table3.2.1.16 Microproposition of the pilot experiment n°08 Groupe B

Type of error	C	I	Pc	O	Po	A
%	66,66	13,88	13,88	0	0	5,55

Table3.2.1.17 Microproposition of the pilot experiment n°09 Groupe A

Type of error	C	I	Pc	O	Po	A
%	13,88	44,44	22,22	0	13,88	5,55

Table3.2.1.18 Microproposition of the pilot experiment n°09 Groupe B

Type of error	C	I	Pc	O	Po	A
%	47,22	41,66	5,55	0	0	5,55

Table3.2.1.19. Microproposition of the pilot experiment n°10 Groupe A

Type of error	C	I	Pc	O	Po	A
%	13,88	47,22	13,88	5,55	13,88	5,55

Table3.2.1.20 Microproposition of the pilot experiment n°10 Groupe B

Type of error	C	I	Pc	O	Po	A
%	47,22	33,33	8,33	5,55	0	5,55

Table3.2.1.21 Microproposition of the pilot experiment n°11 Groupe A

Type of error	C	I	Pc	O	Po	A
%	27,77	38,88	13,88	0	13,88	5,55

Table3.2.1.22 Microproposition of the pilot experiment n°11 Groupe B

Type of error	C	I	Pc	O	Po	A
%	86,11	5,55	8,33	0	0	0

Table3.2.1.23 Microproposition of the pilot experiment n°12 Groupe A

Type of error	C	I	Pc	O	Po	A
%	66,66	19,44	13,88	0	0	0

Table3.2.1.24 Microproposition of the pilot experiment n°12 Groupe B

Type of error	C	I	Pc	O	Po	A
%	86,11	5,55	8,33	0	0	0

Table3.2.1.25 Microproposition of the pilot experiment n°13 Groupe A

Type of error	C	I	Pc	O	Po	A
%	72,22	22,22	5,55	0	0	0

Table3.2.1.26 Microproposition of the pilot experiment n°13 Groupe B

Type of error	C	I	Pc	O	Po	A
%	72,22	8,33	13,88	5,55	0	0

Table3.2.1.27 Microproposition of the pilot experiment n°14 Groupe A

Type of error	C	I	Pc	O	Po	A
%	72,22	22,22	5,55	0	0	0

Table3.2.1.28 Microproposition of the pilot experiment n°14 Groupe B

Type of error	C	I	Pc	O	Po	A
%	72,22	22,22	5,55	0	0	0

Table3.2.1.29 Microproposition of the pilot experiment n°15 Groupe A

Type of error	C	I	Pc	O	Po	A
%	5,55	61,11	33,33	0	0	0

Table3.2.1.30 Microproposition of the pilot experiment n°15 Groupe B

Type of error	C	I	Pc	O	Po	A
%	27,77	25	27,77	19,44	0	0

Table3.2.1.31 Microproposition of the pilot experiment n°16 Groupe A

Type of error	C	I	Pc	O	Po	A
%	5,55	47,22	33,33	13,88	0	0

Table3.2.1.32 Microproposition of the pilot experiment n°16 Groupe B

Type of error	C	I	Pc	O	Po	A
%	8,33	52,77	33,33	0	5,55	0

Table3.2.1.33 Microproposition of the pilot experiment n°17 Groupe A

Type of error	C	I	Pc	O	Po	A
%	5,55	41,66	19,44	19,44	13,88	0

Table3.2.1.34 Microproposition of the pilot experiment n°17 Groupe B

The scores of the first seventeen micropropositions demonstrate that group A was more successful in their translations. This is because they used the concept map which allows them to be aware of the hierarchical organisation of concepts as a major factor for knowledge acquisition. They retained information from text A and used it for translating text B. These results have encouraged us to carry out the main experimentation.

The students' comments and answers made us aware of the ambiguity of some questions concerning text analysis technique. The questions 4 and 5 were reformulated. We have replaced text B because it is long as students omitted many micropropositions and also we realized that students found it easy to translate that text. Therefore we replaced this text with text C which contain more specialist structure and terminology.

3.2.2 The results of the main experiment

3.2.2.1 Macropropositions:

Legend:

M=macroproposition

%=percentage of students who produced the macroproposition

M	M1	M2	M3	M4	M5	M6	M7
Subjects	17	28	14	22	32	27	25
%	47,23	77,78	38,89	61,12	89	75	69,45

Table 3.2.2.1 The translation of the macropropositions of text C by group A

M	M1	M2	M3	M4	M5	M6	M7
Subjects	12	27	12	18	26	25	13
%	33,34	75	33,34	50	72,23	69,45	36,12

Table 3.2.2.2.Results of the translation of the macropropositions of text (c) by group B

M1: Table 3.2.1 and table 3.2.2 shows that group A have better global understanding of the maturation process of stem cells as 47,23% succeeded in translating M1 in contrast to only 33,34% from group B.M1 is about the development of common primitive stem cells into mature blood cells.

M2: Also for the second macroproposition which is about the different kinds of red cells, it seems that the score of correct M2 for group A is the highest (77.78%) but the range of difference between the two groups is not as big as for M1. M1 is more complex and involves more links between concepts. Both macropropositions are related to text A.

M3: The lowest score of correct macropropositions for both groups is reported for the third macroproposition (M3).M3 is about blood cells precursors which are pronormoblast and myloblast. We may link this score to both lack of domain knowledge and language structure. I was astonished that most students didn’t know how to translate that structure.

M4: 50% of group B translated the fourth macroproposition, which is about the recognition of stem cells; in contrast to 61.12% from group A did .This difference in scores is due to the fact that Group A has better understood the process of development of stem cells into mature cells.

M5: As to M5, which deals with the types of marrow cells that circulate in the peripheral blood ,89% of Group A did well in contrast to 72.23% of group B .The concepts are quite new except for the marrow and peripheral blood. The participants added to their store new concepts by linking them to those learned from text A.

M6: it is about stromal cells of the marrow. It was translated by 75% of group A compared to 69.45% from group B .The reason for such a difference in scores is that group A has used the concept map.

M7: It is about the reaction between stem cells and marrow stromal cells through ligands. The magnitude of difference is big. It presupposes that group B didn't understand that microproposition because they didn't use the concept map. Knowledge accumulates if it is organized.

The majority of group B didn't understand text meaning and this is because they are not aware of how to organize knowledge. These scores corroborate our hypothesis. The macrostructure was almost integrated successfully by group A .As we stated before, macropropositions provide for the organization of the text. They form the global structure of the text. They are responsible for structuring micropropositions as they occupy the highest position.

Our analysis is not confined to analysing macropropositions. As mentioned before, we will tackle micropropositions .Micropropositions are information sentence by sentence which we will analyse in the next section.

3.2.2.2. Microproposition

Legend of the tables of the micropropositions scores	
C=correct microproposition	**I=incorrect microproposition**
Pc= partially correct microproposition	**O= omitted microproposition**
A= added microproposition	**%=percentage of students**
Po=partially omitted microproposition	

Type of error	C	I	Pc	O	Po	A
Subjects	4	1	14	4	6	0
%	30,55	2,77	38,88	11,11	16,66	0

Table3.2.2.3. Microproposition of the main experiment n°01 group A

Type of error	C	I	Pc	O	Po	A
Subjects	3	0	26	7	0	0
%	8,33	0	72,22	19,44	0	0

Table3.2.2.4. Microproposition of the main experiment n°01 group B

P1: The first microproposition is about the sites of common primitive stem cells. It was successfully translated by 30.55% students from group A compared to 8.33% from group B. The percentage of partially correct macropropositions of group B (72.22%) is superior to that of group A (38.88%).This means that group B had assimilated some concepts that helped them to perform a partial transfer of microproposition n°01 but not as many as group A.

The number of subjects of group A who omitted the whole microproposition is (11,11%) which is inferior to that of group B (19.44%).The omission infers that the student didn't understand the meaning of the microproposition. Most of the errors concern the concept primitive stem cells and bone marrow. Remember that the concept bone marrow was previously translated in text A.

The above results demonstrate that unlike group B, the majority of students from group A learned the concept marrow and linked it to the concept common primitive stem cells i.e., the process of the integration of these two concepts was successful. What follows are some examples of student's errors

Eg:

الخلايا الجذعية الأولية المشتركة في, لديها القدرة علي نسخ نفسها

There is omission of the word *marrow* and wrong transfer of the word *Common primitive stem cells*

Eg:

الخلية الجذعية الأولية المشتركة في مخ العظم لها القدرة

The student made two errors in the rendition of *bone marrow* and also *common primitive stem cells.*

Type of error	C	I	Pc	O	Po	A
Subjects	6	5	1 3	0	11	0
%	16,66	13,88	36,11	0	30,55	0

Table3.2.2.5. Microproposition of the main experiment n°02 group A

Type of error	C	I	Pc	O	Po	A
Subjects	4	19	13	0	0	0
%	11,11	52,77	36,11	0	0	0

Table:3.2.2.6. Microproposition of the main experiment n°02 group B

P2: This microproposition is about cell replication: one of the steps towards forming mature blood cells, which consists of reproducing or making an exact copy or copies of a genetic material, a cell, or an organism. Table3.2.2.5 shows that 16.66% percent of group A did well

in rendering that microproposition compared to only 11.11% for group B (Table:3.2.2.6). Most errors were in the translation of the term *common primitive cells* and also for *replication*. The score of incorrect micropropositions is very high for group B and that of partial omissions is 0% because the majority of students from this group find it difficult to either retrieve concepts they learned from text B or they didn't learn them at all. The concept map allowed students from group A to retain more information from text A and use it in translating text C.

Type of error	C	I	Pc	O	Po	A
Subjects	5	7	12	0	12	0
%	13,88	19,44	33,33	0	33,33	0

Table3.2.2.7 Microproposition of the main experiment n°03 group A

Type of error	C	I	Pc	O	Po	A
Subjects	4	23	9	0	0	0
%	11,11	63,88	25	0	0	0

Table3.2.2.8 Microproposition of the main experiment n°03 group B

P3: this microproposition concerns cell proliferation. Cell proliferation is controlled by growth factors that bind to Receptors on the cell surface that connect to Signalling molecules (signal transduction pathway) that convey message from receptor to the nucleus where transcription factors bind to DNA, turning on or off the production of proteins that Cause cells to continue dividing(FHCC[6]).The magnitude of difference of correct micrpropositions between the two groups is small: 13,88% for group A and 11.11% for group B did whereas that of incorrect microprpoposition is very big (group A 19.44%, group B 66.88%). This means that groupA produced better translation of text A because they used the concept map tool.

[6] Fred Hutchinson Cancer Research Center is a world leader in research to understand, treat and prevent cancer, HIV/AIDS and other life-threatening diseases. Founding members of the center are credited with pioneering bone-marrow transplantation as a successful treatment for leukemia and other blood diseases.

Here is an example of incorrect proposition:

Eg:

إن الخلايا الجذعية الأولية المشتركة في النخاع لديها القدرة على إعادة نسخ نفسها لكي تزيد من عدد خلايا جينية معينة

Typeof error	C	I	Pc	O	Po	A
Subjects	6	7	12	0	11	0
%	16,66	19,44	33,33	0	30,55	0

Table3.2.2.9 Microproposition of the main experiment n°04 group A

Type of error	C	I	Pc	O	Po	A
Subjects	4	19	11	2	0	0
%	11,11	52,77	30,55	5,55	0	0

Table3.2.2.10 Microproposition of the main experiment n°04 group B

P4: microproposition n°4 is about differentiation during which cells change their shapes. Sores reveal that 19.44% of group A generated it accurately in contrast to only (11.11%) for group B. The scores are low for both groups but group A generated a better translation because they used the concept map which allowed them to better conceptualise the differentiation process, which is one of the steps of the maturation of blood cells; a concept that they have already came across in text B.

Type of error	C	I	Pc	O	Po	A
Subjects	15	7	11	1	2	0
%	41,66	19,44	30,55	2,77	5,55	0

Table3.2.2.11. Microproposition of the main experiment n°05group A

Type of error	C	I	Pc	O	Po	A
Subjects	7	15	12	0	2	0
%	19,44	41,66	33,33	0	5,55	0

Table3.2.2.12. Microproposition of the main experiment n°05 group B

P5: This microproposition is about the division of progenitor cells within the marrow .The progenitor stem cells are the outcome of the replication, proliferation and differentiation of common primitive stem cells. The percentage of students of group A (41.66%) who produced correct micropropositions is superior to that of group B (19.44%).The concept map helped the student to be aware of organizing knowledge in a hierarchical order which served them in retaining and retrieving concepts ,they learned from text A,from their memory.

Eg:

حيث أنها بعد انقسامات للخلايا داخل النخاع

Type of error	C	I	Pc	O	Po	A
Subjects	15	8	10	0	3	0
%	41,66	22,22	27,77	0	8,33	0

Table3.2.2.13 Microproposition of the main experiment n°06 group A

Type of error	C	I	Pc	O	Po	A
Subjects	11	17	7	1	0	0
%	30,55	47,22	19,44	2,77	0	0

Table3.2.2.14 Microproposition of the main experiment n°06 group B

P6: Progenitor red cells are the next step in the development of mature red cells. Microproposition number 6 comprises that idea. Like in the previous micropropositions, group A did well. They are 41.66% to produce correct microproposition and 27.77 %to generate partially correct propositions and 8.33% partially omitted microproposition. Students who failed to translate this microproposition didn't make the link between progenitor stem cells and mature red cells. Here is an example of wrong microproposition

Eg:

الخلايا السالفة بعد انقسام العديد من الخلايا داخل النخاع من الخلايا الناضجة

Type of error	C	I	Pc	O	Po	A
Subjects	31	3	0	2	0	0
%	86,11	8,33	0	5,55	0	0

Table3.2.2.15. Microproposition of the main experiment n°07 group A

Type of error	C	I	Pc	O	Po	A
Subjects	26	6	0	3	1	0
%	72,22	16,66	0	8,33	2,77	0

Table3.2.2.16. Microproposition of the main experiment n°07 group B

P7: This microproposition is linked directly to text A as it is about red cells. The participant should retrieve from his memory the concept of red cell maturation he dealt with in text A. Referring to tables 3.2.2.15and 3.2.2.16 ,we notice that students from group A (86,11%) were more successful than group B (72.22%) in translating that microproposition. This is because they have used the concept map which helped them to establish the links between concepts and organize them.

Eg:

من الخلايا الطبيعية (الخلايا الحمراء.....

Type of error	C	I	Pc	O	Po	A
Subjects	29	6	0	1	0	0
%	80,55	16,66	0	2,77	0	0

Table3.2.2.17 Microproposition of the main experiment n°08 group A

Type of error	C	I	Pc	O	Po	A
Subjects	25	6	3	1	1	0
%	69,44	16,66	8,33	2,77	2,77	0

Table3.2.2.18 Microproposition of the main experiment n°08 group B

P8: it is linked to the text A like microproposition n° 7. 80.55% of students from group A rendered it well compared to 69.44% from group B. Group A performance was the best because their knowledge is better organized.

Type of error	C	I	Pc	O	Po	A
Subjects	30	5	0	1	0	0
%	83,33	13,88	0	2,77	0	0

Table3.2.2.19 Microproposition of the main experiment n°09 group A

Type of error	C	I	Pc	O	Po	A
Subjects	26	6	2	1	1	0
%	72,22	16,66	5,55	2,77	2,77	0

Table3.2.2.20 Microproposition of the main experiment n°09 group B

P9: This microproposition is also related to text A, it is about platelets .Students who are using the concept map (83.33%) were more akin to retrieve information they had learned from text A and used it for the translation of text C.

Type of error	C	I	Pc	O	Po	A
Subjects	20	4	3	1	8	0
%	55,55	11,11	8,33	2,77	22,22	0

Table3.2.2.21 Microproposition of the main experiment n°10 group A

Type of error	C	I	Pc	O	Po	A
Subjects	8	3	1	4	20	0
%	22,22	8,33	2,77	11,11	55,55	0

Table3.2.2.22 Microproposition of the main experiment n°10 group B

P10: it is about lymphocytes. The scores in tables 3.2.2.21 and 3.2.2.22 also show that groupA (55.55%) was more successful in rendering this microproposition than group B

(22.22%). The concept lymphocyte was previously learned in text A and most students from groupA (55.55%) remembered it.

Eg:

تشكل الخلايا الناضجة (الخلايا الحمراء،غرانيلوسيت،مونوسيت

Type of error	C	I	Pc	O	Po	A
Subjects	21	4	6	1	4	0
%	66,66	11,11	16,66	2,77	2,77	0

Table3.2.2.23 Microproposition of the main experiment n°11 group A

Type of error	C	I	Pc	O	Po	A
Subjects	24	5	2	4	1	0
%	50	13,88	22,22	11,11	2,77	0

Table3.2.2.24 Microproposition of the main experiment n°11 group B

P11: Platelet is the other composer of blood. Like the concept lymphocyte, the concept platelet is also supposed to be learned from text A; however group B (50%) was not as good as groupA (66.66%) in remembering it.

Type of error	C	I	Pc	O	Po	A
Subjects	29	4	3	0	0	0
%	80,55	11,11	8,33	0	0	0

Table3.2.2.25 Microproposition of the main experiment n°12 group A

Type of error	C	I	Pc	O	Po	A
Subjects	11	7	6	11	1	0
%	30,55	19,44	16,66	30,55	2,77	0

Table3.2.2.26 Microproposition of the main experiment n°12 group B

P12: Peripheral blood cells are the cellular components of blood, which are red blood cells, white blood cells, and platelets. They are found within the circulating pool of blood and not sequestered within the lymphatic system, spleen, liver, or marrow. The two tables:3.2.2.25 and 3.2.2.26 mention that group A (80.55%) was much better than group B (30.55%) in redering that microproposition. Though the concept of peripheral blood is new, most of group A have succeeded in translating it.

Type of error	C	I	Pc	O	Po	A
Subjects	12	16	7	0	0	0
%	33,33	44,44	19,44	0	0	2,77

Table 3.2.2.27 Microproposition of the main experiment n°13 group A

Type of error	C	I	Pc	O	Po	A
Subjects	11	19	6	0	0	0
%	30,55	52,77	16,66	0	0	0

Table3.2.2.28 Microproposition of the main experiment n°13 group B

P13: Precursor cells are stem cells that have developed to the stage where they are committed to forming a particular kind of new blood cell .The precursor stated in this microproposition is that of red cells which is called *the pronornoblast*. The results indicate that 33.33% of group A succeeded to translate that microproposition while only 30.55% of group B did. The microproposition is related to red cells and the maturation process. Group B are not using the concept map that's why they have a lower score.

Type of error	C	I	Pc	O	Po	A
Subjects	4	23	8	0	1	0
%	11,11	63,88	22,22	0	2,77	0

Table3.2.2.29. Microproposition of the main experiment n°14 group A

Type of error	C	I	Pc	O	Po	A
Subjects	6	27	3	0	0	0
%	16,66	75	8,33	0	0	0

Table3.2.2.30. Microproposition of the main experiment n°14 group B

P14: The granulocyte precursor (one of the kinds of white cells) is myeloblast; tables 3.2.2.29and 3.2.2.30 show that the score of subjects who translated this microproposition correctly is low for both groups. Though group A has used the concept map their score (11.11%) was lower than that of group B (16.66%).

Type of error	C	I	Pc	O	Po	A
Subjects	6	23	6	0	1	0
%	16,66	63,88	16,66	0	2,77	0

Table3.2.2.31 Microproposition of the main experiment n°15 group A

Type of error	C	I	Pc	O	Po	A
Subjects	5	23	6	1	0	1
%	13,88	63,88	16,66	2,77	0	2,77

Table3.2.2.32 Microproposition of the main experiment n°15 group B

P15: it is about the precursor of monocyte which is the same as that of granulocytes. Both scores are very low and the highest score is achieved by group A (16.66%), but again the range of difference is not big. The concept map and the text analysis technique were not of great help for translating this microproposition.

Eg:

الخلايا الحمراء الطليعة قابلة للتعرف علي الخلايا السلفية الأرومة السوية و الخلايا الحبيبية أو الوحيدة الأرومة النخاعية

Type of error	C	I	Pc	O	Po	A
Subjects	18	6	9	3	0	0
%	50	16,66	25	8,33	0	0

Table3.2.2.33 Microproposition of the main experiment n°16 group A

Type of error	C	I	Pc	O	Po	A
Subjects	8	12	11	3	1	1
%	22,22	33,33	30,55	8,33	2,77	2,77

Table3.2.2.34 Microproposition of the main experiment n°16 group B

P16: It deals with the first detected difference between cells families, which is between lymphoid and myeloid cells. Students from groupA (50%) were more likely to translate it accurately because the process of integration of concepts was more successful. The concept map helped them organize their knowledge.

Type of error	C	I	Pc	O	Po	A
Subjects	15	6	9	4	2	0
%	41,66	16,66	25	11,11	5,55	0

Table3.2.2.35. Microproposition of the main experiment n°17 group A

Type of error	C	I	Pc	O	Po	A
Subjects	8	6	18	0	3	1
%	22,22	16,66	50	0	8,33	2,77

Table3.2.2.36. Microproposition of the main experiment n°17 group B

P17: 41.66% from group A did well compared to 22.22% from group B .This microproposition is about the difficulty to depict stem cells shape. It is new information which is not directly linked to text A, but indirectly through stem cells.

Type of error	C	I	Pc	O	Po	A
Subjects	18	7	7	1	3	0
%	50	19,44	19,44	2,77	8,33	0

Table3.2.2.37. Microproposition of the main experiment n°18 group A

Type of error	C	I	Pc	O	Po	A
Subjects	8	8	18	0	1	1
%	22,22	22,22	50	0	2,77	2,77

Table3.2.2.38. Microproposition of the main experiment n°18 group B

P18: it is also about the recognition of progenitor cells. Half of the experimental group has translated this microproposition correctly compared to only 22.22% from the control group

Type of error	C	I	Pc	O	Po	A
Subjects	18	9	7	1	1	0
%	50	25	19,44	2,77	2,77	0

Table3.2.2.39. Microproposition of the main experiment n°19 group A

Type of error	C	I	Pc	O	Po	A
Subjects	17	11	6	1	1	0
%	47,22	30,55	16,66	2,77	2,77	0

Table3.2.2.40. Microproposition of the main experiment n°19 group B

P19: this microproposition deals with the morphology of stem cell. Stem cells are compared to lymphoid cells. Group A (50%) has a better score in translating this microproposition.

Type of error	C	I	Pc	O	Po	A
Subjects	16	9	7	3	1	0
%	44,44	25	19,44	8,33	2,77	0

Table3.2.2.41. Microproposition of the main experiment n°20 group A

Type of error	C	I	Pc	O	Po	A
Subjects	16	11	7	1	1	0
%	44,44	30,55	19,44	2,77	2,77	0

Table3.2.2.42. Microproposition of the main experiment n°20 group B

P20: The results displayed in tables 3.2.2.41and 3.2.2.42 display the same score (44.44%) for both groups concerning the correct microproposition .Both groups did well in their translation.

Type of error	C	I	Pc	O	Po	A
Subjects	9	7	16	0	4	0
%	25	19,44	44,44	0	11,11	0

Table3.2.2.43. Microproposition of the main experiment n°21 group A

Type of error	C	I	Pc	O	Po	A
Subjects	4	12	16	1	3	0
%	11,11	33,33	44,44	2,77	8,33	0

Table3.2.2.44. Microproposition of the main experiment n°21 group B

Type of error	C	I	Pc	O	Po	A
Subjects	13	5	13	1	3	1
%	36,11	13,88	36,11	2,77	8,33	2,77

Table3.2.2.45. Microproposition of the main experiment n°22 group A

Type of error	C	I	Pc	O	Po	A
Subjects	11	7	11	5	2	0
%	30,55	19,44	30,55	13,88	5,55	0

Table3.2.2.46 Microproposition of the main experiment n°22 group B

P21 and P22 are about the detection of progenitor cells in laboratory through in vitro assays which are different methods of measurement. The percentages of correct micropropositions also demonstrate that groupA (36.11%) have better integrated the new concepts**.**

Eg:

الخلايا السلفية يمكن وضعها في أنبوب مقايسات أين تتخذ مستعمرات

Type of error	C	I	Pc	O	Po	A
Subjects	23	3	7	0	1	0
%	66,66	8,33	19,44	0	2,77	2,77

Table3.2.2.47 Microproposition of the main experiment n°23 group A

Type of error	C	I	Pc	O	Po	A
Subjects	16	3	12	2	1	2
%	44,44	8,33	33,33	5,55	2,77	5,55

Table3.2.2.48 Microproposition of the main experiment n°23 group B

Type of error	C	I	Pc	O	Po	A
Subjects	26	0	6	4	0	0
%	72,22	0	16,66	11,11	0	0

Table3.2.2.49 Microproposition of the main experiment n°24 group A

Type of error	C	I	Pc	O	Po	A
Subjects	16	4	12	1	1	2
%	44,44	11,11	33,33	2,77	2,77	5,55

Table3.2.2.50 Microproposition of the main experiment n°24 group B

P23 and P24 are about the site of progenitor and stem cells .As for P21 and P22, group B had a better performance (72.22%) because they used the concept map

Type of error	C	I	Pc	O	Po	A
Subjects	27	0	9	0	0	0
%	75	0	25	0	0	0

Table3.2.2.51 Microproposition of the main experiment n°25 group A

Type of error	C	I	Pc	O	Po	A
Subjects	23	2	6	4	1	0
%	63,88	5,55	16,66	11,11	2,77	0

Table3.2.2.52 Microproposition of the main experiment n°25 group B

P25: It conveys new information, anew kind of marrow cell which is the stromal cell. GroupA (75%) have a better conceptualization of this microproposition as they produced more correct micropropositions.

Type of error	C	I	Pc	O	Po	A
Subjects	24	2	6	4	0	0
%	66,66	5,55	16,66	11,11	0	0

Table3.2.2.53 Microproposition of the main experiment n°26 group A

Type of error	C	I	Pc	O	Po	A
Subjects	27	4	0	5	0	0
%	75	11,11	0	13,88	0	0

Table3.2.2.54 Microproposition of the main experiment n°26 group B

Type of error	C	I	Pc	O	Po	A
Subjects	30	1	1	4	0	0
%	83,33	2,77	2,77	11,11	0	0

Table3.2.2.55 Microproposition of the main experiment n°27group A

Type of error	C	I	Pc	O	Po	A
Subjects	23	4	0	9	0	0
%	63,88	11,11	0	25	0	0

Table3.2.2.56 Microproposition of the main experiment n°27group B

Type of error	C	I	Pc	O	Po	A
Subjects	27	1	5	3	0	0
%	75	2,77	13,88	8,33	0	0

Table3.2.2.57 Microproposition of the main experiment n°28group A

Type of error	C	I	Pc	O	Po	A
Subjects	24	2	4	6	0	0
%	66,66	5,55	11,11	16,66	0	0

Table3.2.2.58 Microproposition of the main experiment n°28 group B

Type of error	C	I	Pc	O	Po	A
Subjects	27	4	0	5	0	0
%	75	11,11	0	13,88	0	0

Table3.2.2.59 Microproposition of the main experiment n°29 group A

Type of error	C	I	Pc	O	Po	A
Subjects	26	3	0	7	0	0
%	72,22	8,33	0	19,44	0	0

Table3.2.2.60 Microproposition of the main experiment n°29group B

P26 ,P27,P28 and P29: They are about the kinds of stromal cells, and participants directly quoted them from the list of terminology .That is why we notice that scores are good for both groups.

Type of error	C	I	Pc	O	Po	A
Subjects	7	11	9	6	3	0
%	19,44	30,55	25	16,66	8,33	0

Table3.2.2.61 Microproposition of the main experiment n°30 group A

Type of error	C	I	Pc	O	Po	A
Subjects	1	7	16	12	0	0
%	2,77	19,44	44,44	33,33	0	0

Table3.2.2.62 Microproposition of the main experiment n°30 group B

P30: Most students who erroneously rendered this microproposition thought that the adhesion molecule doesn't constitute a part of the stromal cells but are only linked to them. Participants using the concept map (19.44%) have a far better score, though low, than group B (2.77%) because their knowledge was better organized

Type of error	C	I	Pc	O	Po	A
Subjects	17	7	7	3	1	1
%	47,22	19,44	19,44	8,33	2,77	2,77

Table3.2.2.63 Microproposition of the main experiment n°31group A

Type of error	C	I	Pc	O	Po	A
Subjects	1	15	9	11	0	0
%	2,77	41,66	25	30,55	0	0

Table3.2.2.64 Microproposition of the main experiment n°31 group B

P31: it is about the interaction between stromal cells and ligeands. Group A (69.44%) was better than the control group (47.22%) in translating it because their knowledge is well structured which allowed for a better conceptualization.

Eg :

الخلايا السدوية لنقي العظام (الأرومة الليفية ،الخلايا البطانية و البلعمية و الذهنية)تلتصق بجزيئات

Type of error	C	I	Pc	O	Po	A
Subjects	24	4	7	1	0	0
%	66,66	11,11	19,44	2,77	0	0

Table3.2.2.65 Microproposition of the main experiment n°32 group A

Type of error	C	I	Pc	O	Po	A
Subjects	19	6	1	10	0	0
%	52,77	16,66	2,77	27,77	0	0

Table3.2.2.66 Microproposition of the main experiment n°32 group B

P32: it is about the location of ligeands which is the stem cell. Group A(69,44%) was better than the control group (47,22%) in translating it.

Type of error	C	I	Pc	O	Po	A
Subjects	18	5	6	7	0	0
%	50	13,88	16,66	19,44	0	0

Table3.2.2.67 Microproposition of the main experiment n°33 group A

Type of error	C	I	Pc	O	Po	A
Subjects	6	12	7	11	0	0
%	16,66	33,33	19,44	30,55	0	0

Table3.2.2.68 Microproposition of the main experiment n°33 group B

P33: the information conveyed by this microproposition is that the adhesion molecules are responsible for cell survival. 50% of group A have grasped this information compared to 16,66 % students from group B.

3.2.2.3 Connection between micropropositions

We didn't provide a detailed analysis of connection between the micropropositions. The reason is that it is time consuming. We have to analyse the direct and indirect links. There are researchers who use the Latent Semantic Analysis Application[7] to count the rate of connection between the different segments of the text; however, this application is only provided for English language.

High connection	Medium connection	Low connection
6	**20**	**10**
16,66%	**55,55%**	**27.77%**

Table3.2.2.69. Results of connection group A

High connection	Medium connection	Low connection
5	**8**	**23**
13,88%	**22,22%**	**63,88%**

Table3.2.2.70. Results of connection group B

Table3.2.2.69 shows that the largest portion of students who belong to group A has a medium connection of text propositions whereas table3.2.2.70 shows that approximately 74% students from group B have a low connection. Therefore most students from group A

[7]Latent Semantic Analysis applications exploit a new method for determining and representing the similarity of meaning of words and passages by statistical analysis of large text corpora. After processing a large sample of machine-readable language, Latent Semantic Analysis (LSA) represents the words used in it, and any set of these words-such as those contained in a sentence, paragraph, or essay, either taken from the original corpus or new-as points in a very high (e.g. 50-1,000) dimensional semantic space(Landauer and Dumais, 1997)

succeeded to form the linkages between texts micropropositions. Thanks to the concept map tool, they were conscious that making links is an important factor for comprehend and acquire knowledge.

Discussion:

The analysis of text C at the macro-level and micro-level revealed that participants who used the concept map technique have a better representation of text knowledge and therefore performed a better translation.

Text C comprises seven macropropositions, which constitute its global structure. The outcome results of the experiment demonstrate that the experimental group was more successful in translating them. Nearly half of them have grasped the meaning of the development of stem cells into mature blood cells. The majority have retained the different kinds of blood cells and how stem cells are recognized, the marrow cells which circulate in the peripheral blood, the different types of stromal cells and the reaction between stem cells and the marrow stromal cells through ligands. They only failed in the rendering the third macroproposition, which is about blood cells precursors.

The global structure of the text can only be rendered if the translator possesses knowledge about the domain of the text. Group A used the concept map technique which allowed them to retain information from text A that served them in carrying out the translation of text C. Unlike the control group, they were aware of the hierarchical organization and its importance for maintaining information.

As far as the microstructure is concerned, group A was more successful than group B in translating the thirty three micropropositions, which constitute the microstructure of text A. However their scores were not good for P1, P2, P3, P4, P5, P6, P13, P14, P15, P21, P22 and P30 as they are below 40%.Rendering the whole micropropositions entails having an acute knowledge of text domain. We would have obtained better results if the students have

received a period of training of six months on using the concept map. Moreover, the students could gather more information if the experiment was performed using several texts and not only two texts.

The micropropositions are interrelated directly or indirectly. The scores reveal that group A established more links between micropropositions, and hence between concepts. Connection between the different concepts is primordial for acquiring knowledge. We would have performed a better analysis using the LSA.

CONCLUSION

The present research explores the benefit of Novak's concept map in translating medical texts. It is a useful tool for structuring and organizing the student's knowledge. Medical Knowledge is potentially important for carrying out the translation task, and the student can have access to it through documentation or medical specialists and most importantly through texts they translate. The concept map can be used during the translation process to structure text knowledge hierarchically and hence enables its acquisition.

This study is basically experimental .Two groups of students from the translation department were assigned a test which consists of translating a medical text. The first group performed the task using the concept map and the second one used the text analysis technique of Nord (1988/2005)

Bringing the research results together, it is inferred that the concept map is an effective metacognitive instructional tool that improves translation quality .The students who used the concept map technique have a better performance than those who used the text analysis technique which is based on finding the topic sentences and the semantic field of words selected from the text.

The students were not motivated at using the concept map during the training period. However they changed their attitude toward being positive, after practice. They said they noticed that they can carry the translation task easily because it can provide for planning, and they increased their store of information extracted from the text they had translated.

The concept map enables the conceptual integration process through bringing the students to be conscious of the hierarchical conceptual organization that is primordial for learning. Drawing the map involves arranging concepts and linking between .It is an externalization of thought.

Indeed the concept map technique is one way to help students be conscious of the learning process in translation. Other metacognitive strategies should be taught to the budding translators to help them become autonomous learners as metacognition is the key role for successful translation learning

Besides being a metacognitive tool the concept map can be used as an assessment tool. We can better assess student's comprehension of the text and disclose what goes on inhis mind .We can dissociate between comprehension variable and other variables such as translation strategies.

It is our hope that this research will really lead to review translation teaching in the department of translation by bringing the teachers to put an emphasis on metacognition, hence leading to meaningful learning. .It is again our hope that findings of this research combined with other translation researches in the Algerian universities will contribute to give a new breath to translation teaching.

BIBLIOGRAPHY

1 Anderson,J.R., Bower,G.H. (1980).*Human Associative Memory: A Brief Edition* .USA: Lawrence Erlbaum Associates

2 —— (1981). Concepts, propositions, and schemata: What are the cognitive units? In J. Flowers (Ed.), *Nebraska Symposium on Motivation* (pp121-162). Lincoln, Nebraska: University of Nebraska Press.

3 Ausubel, D.P. (1963). *The Psychology of Meaningful Verbal Learning: An Introduction to School Learning*, New York: Grune & Stratton.

4 Baddely, A.D. (2002). Psychology of memory. In: A.D. Baddeley, M.D.Kopelman and B.A. Wilson (Eds.), *Handbook of memory disorders* (pp. 3-15). USA: Wiley, Chichester.

5 Baddely,A. and Hitch,G.J. (1974). Working memory. In G.H.Bower (ed.).*The psychology of Learning and Motivation*, Vol.8. London: Academic Press.

6 Mona, B and Kirsten, M (1998). *Routlage Encyclopedia of translation studies*. Routledge.

7 Bassnett, S (1980, 3rd edition 2002) .Translation studies. London and New York: Routledge.

8 Borkowski ,J.G,and Muthukrishna,N.(1992).Moving metacognition into the classroom:"Working models" and effective strategy teaching.In M.Pressley,K.R.Harris and J.T.Guthrie (eds.)*Promoting Academic Competence and Literacy in School* (pp.477-501).San Diego ,CA :Academic

9 Bower, G.H. (1990, paper back edition 1995).Awareness, the unconscious, and repression: An experimental psychologist perspective.In J.L.Singer (ed.). *Repression and Dissociation* (pp.209-231) .Chicago: University of Chicago Press.

10 Brown, A.L. (1996).Social interaction and individual understanding in a community of , learners: The influence of Piaget and Vygotsky .In Anastasia Tryphon, J. Jacques Vonèche (eds.) *Piaget-Vygotsky: The Social Genesis of Thought* (p145-170) .UK: Psychology Press.

11 Buzan, T. (1974). *Use your head.* London: BBC Books.

12 Chomsky,N. (1965). *Aspect the theory of syntax*. Calbridge ,MA:MIT Press

13 Collins and Quillian. (1969). Retrieval from semantic memory .*Journal of Verbal Behaviour*,8:240-247

14 Craik, F, I, M and Lockhart.R.S. (1972).Levels of processing: A framework for memory research .*Journal of Verbal Learning and Verbal Behaviour*,11,671-684

15 Crystal,D and Davy,D.(1969) *Investigating English Style:(4.impr.),*Longman ,original From the University of Michigan

16 Dancette, J. (2005) .La representation des connaissances:Son apport à l'étude du processus de traduction.*Meta,50(2),548-559.*

17 —— (1995), Parcours de traduction : étude empirique des processus de traduction. Lille : Presses Universitaires de Lille.

18 Dennett, D. (1986).*Content and Consciousness* .London: Routledge and Kegan Paul.(Original work published 1969).

19 Dimond, S.J.(1976).Brain circuits for consciousness. *Brain, Behaviour and Evolution* ,13, 376-395.

20 Even zohar, I. (1978/2000) 'The position of translated literature within the literary plysystem', In L.Venuti (ed.) (2000, 2nd edition 2006), *Translation Studies Reade*r (pp. 192-7). Routledge.

21 —— (2005, in press) 'Polysystem Theory (Revised)'.In Even-Zohar, Itamar 2005.Papers in culture Research . Tel Aviv: Porter Chair of Semiotics. (Temporary

electronic book).Retrieved from http://www.tau.ac.il/~itamarez/works/papers/papers/ps-revised.pdf

22 Eysenck, M.W and T. Keane (1990, 4th edition 2000), *Cognitive Psychology: A Student's Handbook*. Taylor & Francis

23 Eysenck, M.W. (1993, 2nd edition 2001).*Principles of Cognitive Psychology*. Psychology Press.

24 —— (2004) *Psychology: an International Perspective*, Hove and New York: psychology press, Ltd.

25 Farthing, G.W. (1992).*The Psychology of Consciousness.* Englewood Cliffs, NT: Prentice-Hall.

26 Fischbach, H. (1986) Some anatomical and physiological aspects of medical translation: Lexical equivalence, ubiquitous references and universality of subject minimize misunderstanding and maximizetransfer of meaning. Meta. , 31(1), 16-21.

27 Flavell, J.H. (1976)**.** *Metacognitive Aspects of Problem Solving* **.**In Lauren B. Resnick (ed.), *The Nature of intelligence* (pp 231-236). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

28 Fokkema, D. Ibsch,E (2000) *Knowledge and Commitment: A Problem-Oriented Approach to Literary Studies* ,Amesterdam: John Benjamins.

29 Forman, K.C.(1998) .What can mysticism teach us about consciousness. In Stuart R. Hameroff, Alfred W. Kaszniak&Alwyn C. Scott (eds), *Toward a Science of Consciousness II: The Second Tucson Discussions and Debates* (pp 53-70). US, Massachusetts: MIT.

30 Fred Hutchinson Cancer Research Center, cell proliferation.Retrieved from http://www.fhcrc.org/science/education/courses/cancer_course/basic/molecular/proliferation.html

31 Gentzler, E. (2001, 2nd edition). *Contemporary Translation Theories* .London and New York Routledge

32 Gile,D .(1995).*Basic Concepts and Models for Interpreter and Translator Training.* Amsterdam: John Benjamins.

33 —— (1990).La traduction et l'interprétation comme revelateurs des mechanismes de production et de comprehension de discourse", *Meta* 35(1) ,20-30.

34 Goffin, Roger (1971) 'Pour une formation universitaire "sui generic" du traducteur Reflexion sur certain aspects méthodologiques et sur la recherche scientifique dans le Domaine de la traduction', *Meta* ,16 ,57-68

35 Gonzalez Davies, M (1998), Student assessment by medical specialists Fischbach,H (ed.) *Translation and Medicine*(pp 93-103). Amsterdam :Benjamins

36 Hacker.D.J. (1998) Definitions and empirical foundations.In Hacker, D.J., Dunlosky.J. & .Graesser, A.C (eds.), *Metacognition in Educational Theory and Practice (*pp.1-24) .Lawrence Erlbaum Associates, Inc.

37 Hall, R and.Malia R.G. (1984).Medical Laboratory Haematology, Butterworth and Co (publishers) Ltd.

38 Halliday, M.A.K., Augus, M., and Strevens, P. (1964).*The Linguistic Sciences and Language Teaching* .London: Longman.

39 Hanf, B. M. (1971). Mapping: A technique for TransIating Reading into Thinking. *JomaI of Reading.* Jmuary, 6,225-230.

40 Hambrick, D.Z ., Engle, R.W.(2003).The role of working memory in problem solving. In J.E, Davidson, Robert J. Sternberg (ed.), *The Psychology of Problem Solving (* pp 176-206).Cambridge University Press.

41 Hashweh, M.Z. (1986).Toward an explanation of conceptual change. *European Journal of Science Education*, 8,229-249.

42 Helldén, G. (1999) .A longitudinal study of pupils'understanding of conditions for life ,growth and decomposition. In Bandiera,M.Caravita,E.Torracca *Research in Science Education in Europe* (pp 23-30). Netherland: Kluwer Academic Publishers.

43 Herne,S and Jessel,J. and Griffiths,J (2000).*Study to Teach: A Guide to Studying in Teacher Education* .Routledge, 2000.

44 Holmes, J. (1988 /2006). 'The name and nature of translation studies' in L.Venuti(ed) (2000, 2nd edition 2006), *Translation Studies Reade*r(pp 180-1992) ,Routledge.

45 House, J (1997) *Translation Quality Assessment: A model Rvisited* .G.Narr

46 —— (2000***).*** consciousness and the strategic use of aids in translation. In Sonja Tirkkonen-Condit and Riitta Jääskeläinen *Tapping and Mapping The Process of Translation and Interpreting: Outlooks on Empirical Research* (pp 149-162).Amsterdam: Benjamins.

47 Jakobson ,R.(1959/2006) 'On linguistic aspects of translation' ,in L.Venuti(ed) *Translation Studies Reade*r (2000,2nd edition 2006) ,Routledge pp 138-143

48 James, W. (1950). *The Principles of Psychology*, Courier Dover Publications.

49 Keller,T.&Tergan ,S.O.(2005). Visualizing knowledge and information an introduction .In S.O.Tergan&T.Keller.(eds.) *Knowledge and Information Visualization* (pp1-26) . Springer.

50 kintsch,W (1998) *Comprehension :A Paradigm for Cognition*, Cambridge University Press

51 Lambiotte, J. *G.,* Danseau, D. P., Cross, D. R. & Reynolds, S. B (1989). *Maltirelational Semantic Maps. Educational Review* 1(4), 331-367.

52 Lane.R. (2001). Hierarchical organization of emotional experience and its neural substrates .In Alfred W. Kaszniak Emotions, *Qualia, and Consciousness* (pp 247-270). US and UK: World Scientific.

53 Landauer, T. K., Foltz, P. W., & Laham, D. (1998). Introduction to Latent Semantic Analysis. *Discourse Processes,* 25, 259-284.

54 Lee-jahnke, H. (1998). Training in medical translation with Emphasis on German. In Fischbach**,** H (ed.).*Translation and Medicine* (pp 81-91) *Translation and Medicine*. Amsterdam: Benjamins.

55 —— (2001). L'enseignement de la traduction médicale: un double défi? In: *Meta,* 46 (1), pp 145-153.

56 Lefevere, A. (1992b). *Translation/History/Culture:A Sourcebook*,London and New York: Routledge.

57 —— (1993). *Translating Literature: Practice and Theory in a Comparative Literature Context,* New York: The Modern Language Association of America.

58 Lorscher, W (2005). The translation process :Methods and problems of its investigation, *Meta*.50(2) ,pp.597-608.

59 McMorrow, Leon. (1998). "Breaking the Gereco-Roman mold in medical writing: The many languages of 20th century medicine". In, Fischbach, Henry (ed.)*Translation and Medicine* (pp 13-28). Amsterdam: Benjamins.

60 Mehta, A.B, Hoffbrand, A.V (2005).Haematology at a Glance .Blackwell publishing.

61 Merkley,D.M &Jefferies,D(2002). Guidelines for implementing a graphic organizer.International Reading Association, National Reading Panel (U.S.), International Reading Association (ed). *Evidence-Based Reading Instruction: Putting the National Reading Panel Report into Practice* (pp166-173) .International Reading Association.

62 Munday,J (2001).*Introducing Translation Studies: Theories and Applications*, Routledge.

63 Nelson, T.O. and Narens, L (1990) .Metamemory: A theoretical framework and new findings. In *The Psychology of Learning and Motivation*, 26, 125-173

64 Nelson, TO (1992). *Metacognition: Core readings*. Boston: Allyn and Bacon.

65 —— (1999).Cognition Vs Metacognition .In Sternberg, R.J (ed) *The Nature of Cognition* (pp 625-642). US: Massachusetts Institute of Technology Press.

66 Nguyen, T.C.P (1998). Influence de la carte de concepts et du résumé sur la compréhension et la production orales propres à l'interprétation consécutive chez les étudiants interprétes vietnamiens.Doctoral thesis. Montreal University.

67 Nida ,E.A (1964/2006) 'Principles of correspondence',in L.Venuti (ed) (2000, Énd edition 2006),*Translation Studies Reader* .London and New York :Routledge, pp.126-40

68 —— (1959/1975) 'Principles of translation as exemplified by bible translating'. In Language Structure and Translation: Essays (pp 24-46). Stanford University Press.

69 —— (1969, September).*Science of Translation.Language,* 45(3), 483-498.

70 —— (1975) *Language Structure and Translation: Essays* .California: Stanford University Press

71 Nord, C. (2005). *Text Analysis in Translation: Theory, Methodology, and Didactic Application of a Model for Translation-oriented Text Analysis*.Rodopi

72 Novak, J.D. (1998). *Learning, Creating, and Using Knowledge: Concept Maps as Facilitative Tools in Schools and Corporations*. Lawrence Erlbaum Associates

73 Novak, J.D., Gowin.B. (1984). *Learning how to Learn*, Cambridge University Press

74 PACTE .(2005) .Investigating translation competence: Conceptual and methodological issues Meta ,50(2) , 609-619.

75 Pankratus W.,J. &.Keith,T,M (1987);Building an Organized Knowledge Base:Concept mapping in Secondary School .Paper presented at the 1987 *Meetings of the national Science Teachers Association, Washington, D.C.,March 28,1987*.

76 Paris, S.G., and Winograd, P. (1990).How metacognition can promote academic learning and instruction. In B.F.Jones and L.Idol (eds) *Dimensions of Thinking and Cognitive Instruction* (pp.15-51). .Hillsdale, NJ: Lawrence Erlbaum Associates.

77 Pym, A. (1998). *Method in Translation History*.Mancheter: St Jerome.

78 Raaijmakers, J.G.W (1993).The story of the two store model of memory:Past criticisms,current status ,and future directions. In Meyer, E.D and Kornblum,S (eds.) *Attention and Performance XIV: Synergies in Experimental Psychology, Artificial Intelligence, and Cognitive Neuroscience* . MIT Press,pp467-488

79 Reiss, K.(1981,2006).Type kind and individuality of text:decision making in translation ;translated by S.Kitron,in L Venuti (ed.) (2000,2nd edition 2006), *Translation Studies Reader*, pp.168-179

80 Rosenthal, D. (1993). State consciousness and transitive consciousness, Consciousness and *Cognition* 2,355-363.

81 —— (2000). Consciousness and metacognition .In Dan Sperber(ed.). *Metarepresentations: A Multidisciplinary Perspective* (pp 265-296). US: Oxford University Press.

82 Schacter, D.L. (1991). Consciousness and awareness in memory and amnesia: critical issues. In D. Milner and M. Rugg (Eds.), *Neuropsychology of Consciousness (pp.180-200).* London: Academic Press.

83 Schmaier, A.H and Petruzzelli, L.M (2003) .*Haematology for the Medical Student*.US: Lippincott Williams and Wilkins.

84 Schoenfeld, A.H. (1987).What's all the fuss about metacognition? In A.H. Schoenfeld (ed.).*Cognitive Science and Mathematics Education* (pp.189-215) .Hillsdale, NJ: Lawrence Erlbaum Associates.

85 Schwartz, B.L. and Perfect, T.J. (2002).*Applied Metacognition*. UK: Cambridge University Press.

86 Scott, D. (2001). *Curriculum and Assessment*. Greenwood Publishing Group

87 Staley, D.J. (2002).*Computers, Visualization, and History: How New Technology Will Transform Our Understanding of the Past*. M.E. Sharpe.

88 Steiner, G. (1975, 2nd edition 1992). *After Babel*, New York: Oxford University Press.

89 —— (1984, 2nd edition 1987).*A Reader by George Steiner*, US: Oxford University Press.

90 Stuart-Hamilton, I. (1999). *Key Ideas in Psychology* , Jessica Kingsley Publishers

91 Tergan, S.O and Keller, T. (2005).*Knowledge and Information Visualization*: *Searching for Synergies*. Springer.

92 Toury, G. (1991**).** 'What are Descriptive Studies into Translation Likely to Yield apart from Isolated Description? In M.van Leuven-Zwart kity, Maria Naaijkens Antonius Bernardus and Naaiijkens Ton (eds) *Translation studies* (pp179-192). Amesterdam - Atlanta, GA: Rodopi.

93 Tulving, E. (1985). How many memory systems are there? American .*Psychogist*, 40,385-398.

94 Vandaele, S. (2003).Mise en ligne d'outils pédagogiques: une panacée pour l'enseignement de la traduction, médicale? Meta, 48(3) ,370-378.

95 Van Hoof, H.(1981) .La traduction scientifique: un phénomène récent? .*Langage (Le) et l'Homme Bruxelles* ,46, pp. 25-30.

96 Venuti, L (1994) .*The Translator's Invisibility: A History of Translation*, London and New York: Routledge.

97 Vermeer, H.J. (1989/2006) .Skopos and commission in translational action' in L.Venuti (2000, 2nd edition 2006), *Translation Studies Reader* (pp 227-238).UK: Routledge.

98 Vinay,J.P.and J.Darbelnet(1995/2006) ‘A Methodology for translation ‘.In Jean Paul Vinay and Jean Darbelnet, Comparative Stylistics of French and English trans .and eds ;Juan C.Sager and M.-J.Hamel .Amsterdam and Philadelphia: Benjamins,1995,(pp.31-42) . In L.Venuti (2000, 2nd edition 2006), *Translation Studies Reader* (pp 128-137) .UK: Routledge .[Original work published in 1958].

99 Weissbort, D and Eysteinsson, A. (2006). *Translation: Theory and Practice: A Historical Reade.UK:* Oxford University press

Appendix1: Text A

Haemopoiesis

The blood volume of the normal adult accounts for approximately 70ml.kg, of which 30ml (45 %) is occupied by cellular elements and 40ml (55%) is plasma. The cells are heterogeneous. They consist of erythrocytes, which are disk shaped, non-nucleated, non-motile and contain haemoglobin; the nucleated, motile leucocytes and the platelets. The leucocytes are further divided into granulocytes (neutrophils, eosinophils and basophils), lymphocytes and monocytes. Plasma contains many organic and inorganic compounds, notably proteins, electrolytes, substances absorbed from the gastrointestinal tract, hormones and products of metabolism.

All blood cells have a finite life span which may be shortened in disease .Plasma components, particularly proteins, have a determined rate of turnover which is often expressed as T1/2-the time during which half the substance is removed from the circulation and, in health, renewed. The 'turnover times' may be altered by disease.

The loss of cells through the normal processes of ageing, physiological consumption, and in certain circumstances, by loss from the body, is normally compensated by the process of renewal by the proliferation, maturation and release of new cells from the haemopoietic system -a process referred to as haemopoiesis. The haemopoietic system in the adult consists of the bone marrow and lymphatic system .Other sites of haemopoiesis are active in the embryo and foetus.

(Medical Laboratory Haematology, R.Hall&R.G.Malia ,1984)

Answer the following questions:

I°

- Who is the Sender of this text?
- What is the Sender's intention in writing such a text?
- At which audience is the text directed?
- What is the medium or channel the text is communicated by?
- Where was this text written?

- When was it produced?
- What is its function?

II°

1-What is the subject matter of the text?

2-What is the content of the text?

5-Is the source text an independent text or is it embedded in a larger unit of higher rank?

6-Determine the topic sentences of the text.

7-Is there a conventional composition for this type of text?

8- What is the lexical field of the word ‘blood’?

10-Are sentences long or short, coordinated or subordinated?

11-Translate the text.

Appendix II: Text B

Erythrocytes

The mean cell life of red cells is 120 days ,during which they will travel about 175 miles .On average slightly less than 1% of red cells are the newly formed about 175 miles. On average slightly less than 1% of red cells are the newly formed reticulocytes released from the bone marrow, which take 1-2 days to develop into mature red cells .It is a simple calculation that in a 70 kg subject approximately 2 x 10 red cells are destroyed and replaced each day or on an incredible 2,3 x 10 cells per second.

The mature cell is circular, biconcave and discoid, with an average diameter of 8.4 um in 'wet preparations'.(this is considerably greater than the 7,2-7,4 um diameter in fixed, dried ,blood films).It measures 2,4 um at its thickest point and 1um at the biconcavity and has an approximate surface area of 140 um^2.The total surface area of the circulating red cells is variously quoted as being between 1500 and 2000 times that of the surface area of the body. The average (±2SD) red cell volume (MCV) is 88±6ft.

Red cells are readily deformable which enables them to pass through the smallest blood capillaries and between cell junctions. In vitro they can be drawn through capillaries or micropore filters 3 um in diameter and still regained normal shape. The deformability of the red cell is not matched by an ability to withstand swelling which can only increase the cell volume by about 10% before membrane loses its integrity and releases the cell contents.

(Medical Laboratory Haematology, R.Hall&R.G.Malia ,1984)

Answer the following questions:

I°

- Who is the Sender of this text?
- What is the Sender's intention in writing such a text?
- At which audience is the text directed?
- What is the medium or channel the text is communicated by?
- Where was this text written?
- When was it produced?
- What is its function?

II°

1-What is the subject matter of the text?

2-What is the content of the text?

5-Is the source text an independent text or is it embedded in a larger unit of higher rank?

6-Determine the topic sentences of the text.

7-Is there a conventional composition for this type of text?

8- What is the lexical field of the word 'erythrocyte'?

9-Does the text contain redundancies which might be superfluous for the TT receiver?

10-Are sentences long or short, coordinated or subordinated?

11-Translate the first paragraph of the text.

Appendix III Text C

Stem cells and progenitor cells

A common primitive stem cell in the marrow has the capacity to self replicate, proliferate and differentiate to increasingly specialized progenitor cells which, after many cell divisions within the marrow, form mature cells (red cells, granulocytes, monocytes, platelets and lymphocytes) of peripheral blood. The earliest recognizable red cell precursor is a pronormoblast and the granulocyte or monocyte precursor a myeloblast. An early lineage division is between lymphoid and myeloid cells .Stem and progenitor cells cannot be recognized morphologically; they resemble lymphocytes. Progneitor cells can be detected by *in vitro* assays in which they form colonies. Stem and progenitor cells also circulate in the peripheral blood. The stromal cells of the marrow (fibroplasts, endothelial cells, macrophages, fat cells) have adhesion molecules which react with corresponding ligands on the stem cells and maintain their viability.

(Haematology at a Glance ,Atul B Mehta, A V Hoffbrand ,2005, blackwell publishing)

Questions:

I°

- Sender.a
- Sender's intention.
- The audience the text is directed at.
- The medium or channel the text is communicated by.
- The place
- The time of text production.
- The motive for communication.
- The function

II°

1-What is the subject matter of the text?

2-What is the content of the text?

3-Does the text contain redundancies which might be superfluous for the TT receiver?

4-What information presupposed to be known to the ST receiver has to be verbalized for the TT receiver?

5-Is the source text an independent text or is it embedded in a larger unit of higher rank?

6-Determine the topic sentences of the text.

7-Is there a conventional composition for this type of text?

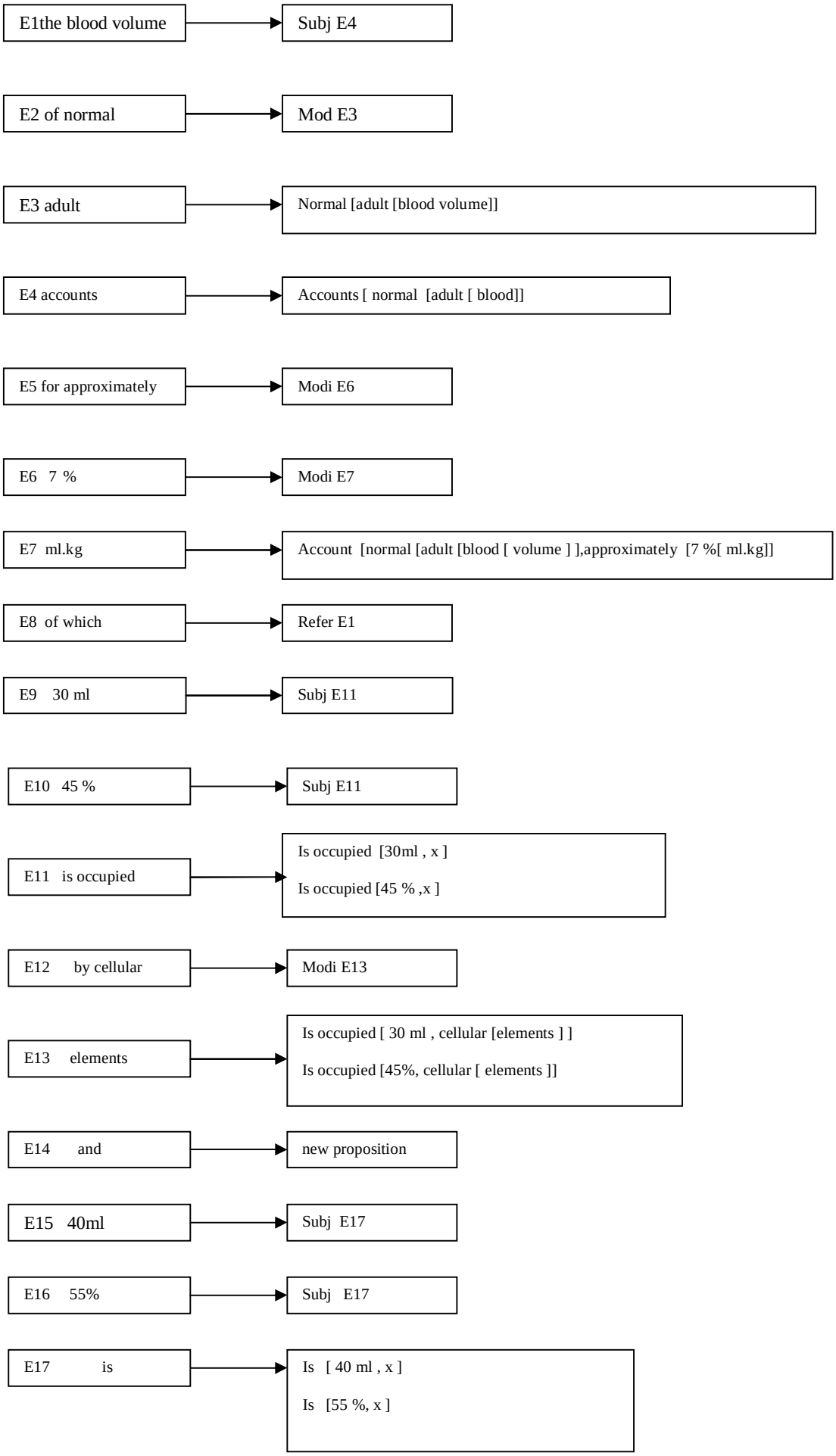
8- What is the lexical field of the word ‘erythrocyte’?

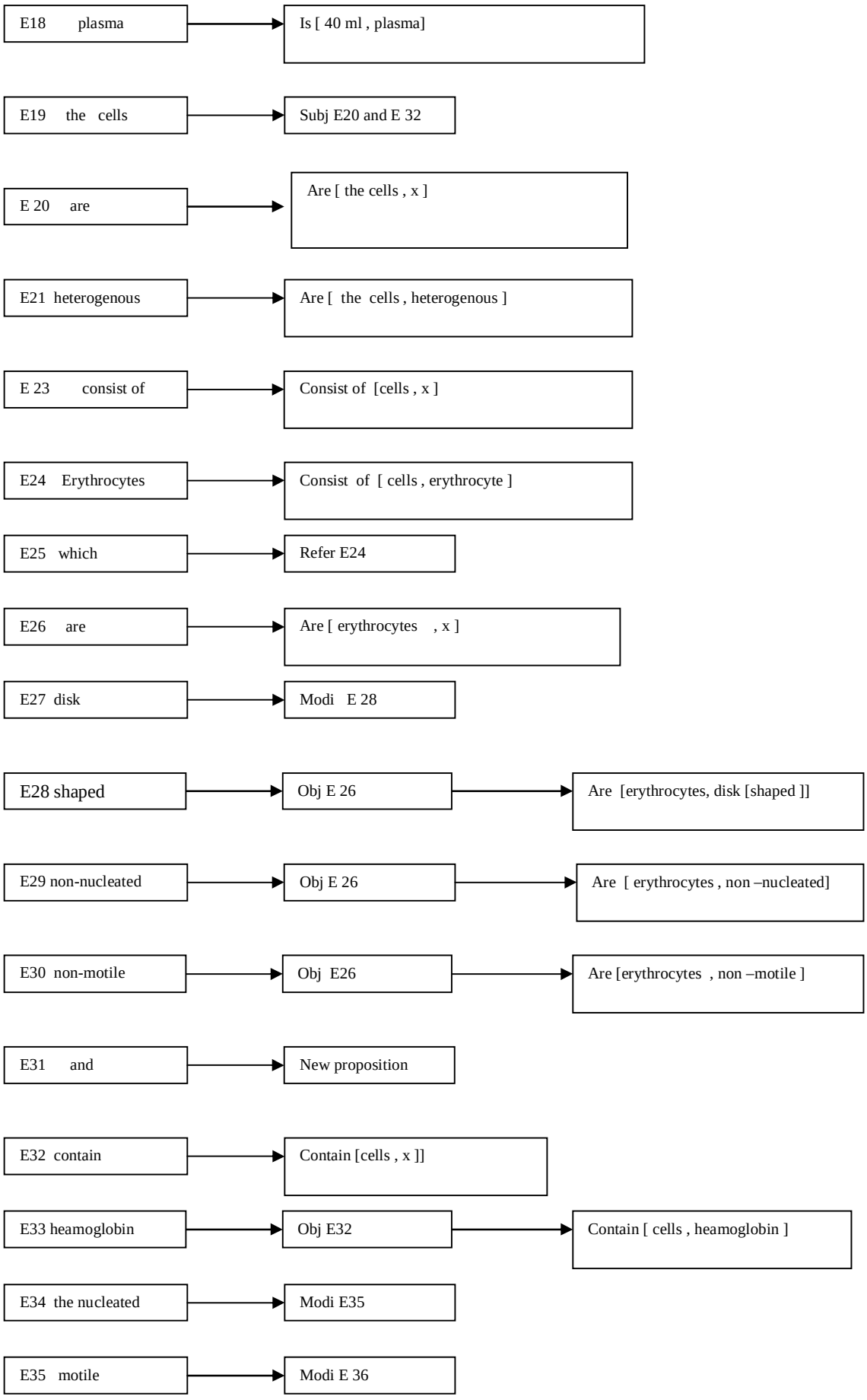
9-Does the text contain redundancies which might be superfluous for the TT receiver?

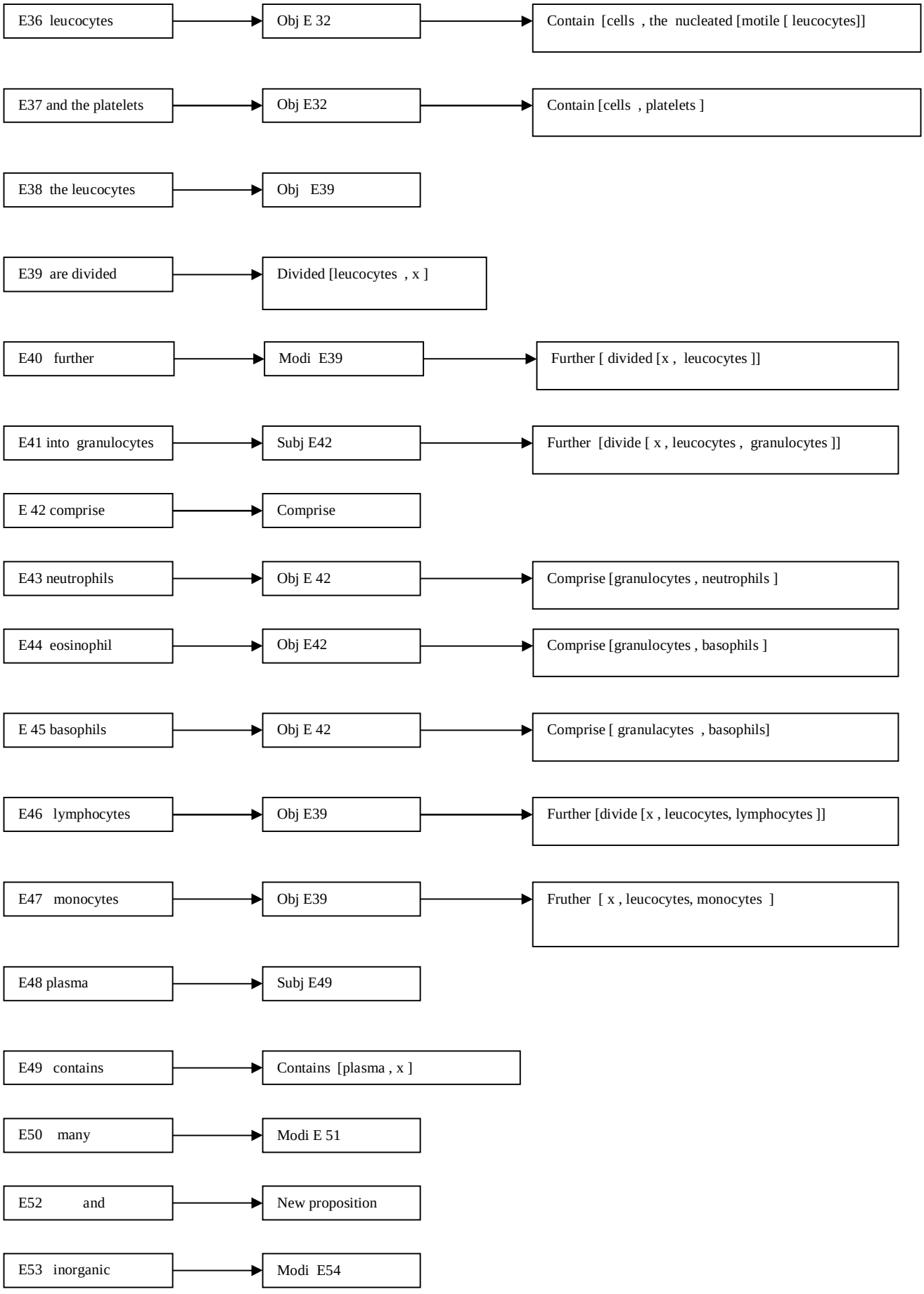
10-What is the lexical field of the words ‘stem cell’ and ‘stromal cell’?

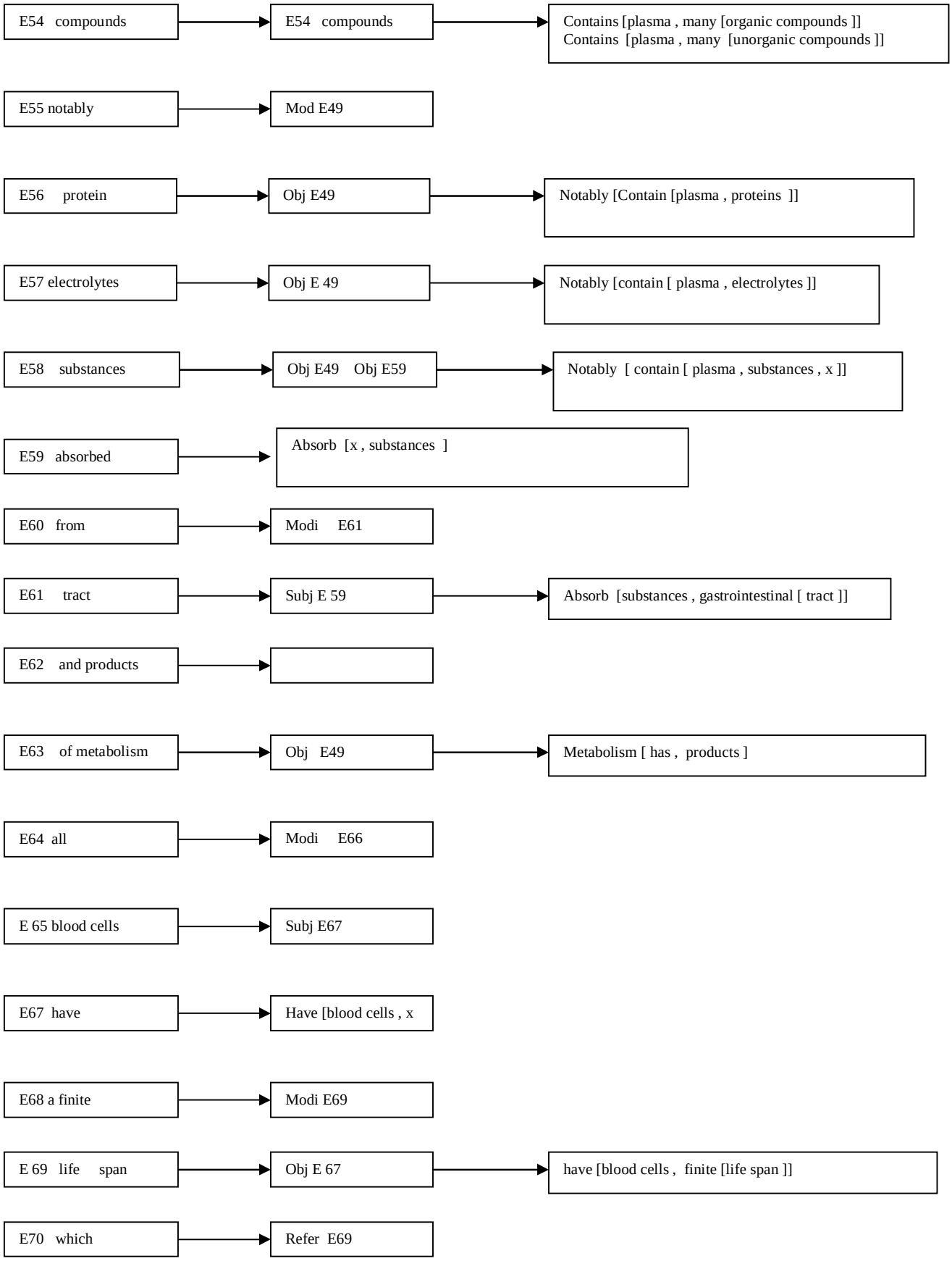
11-Translate the text

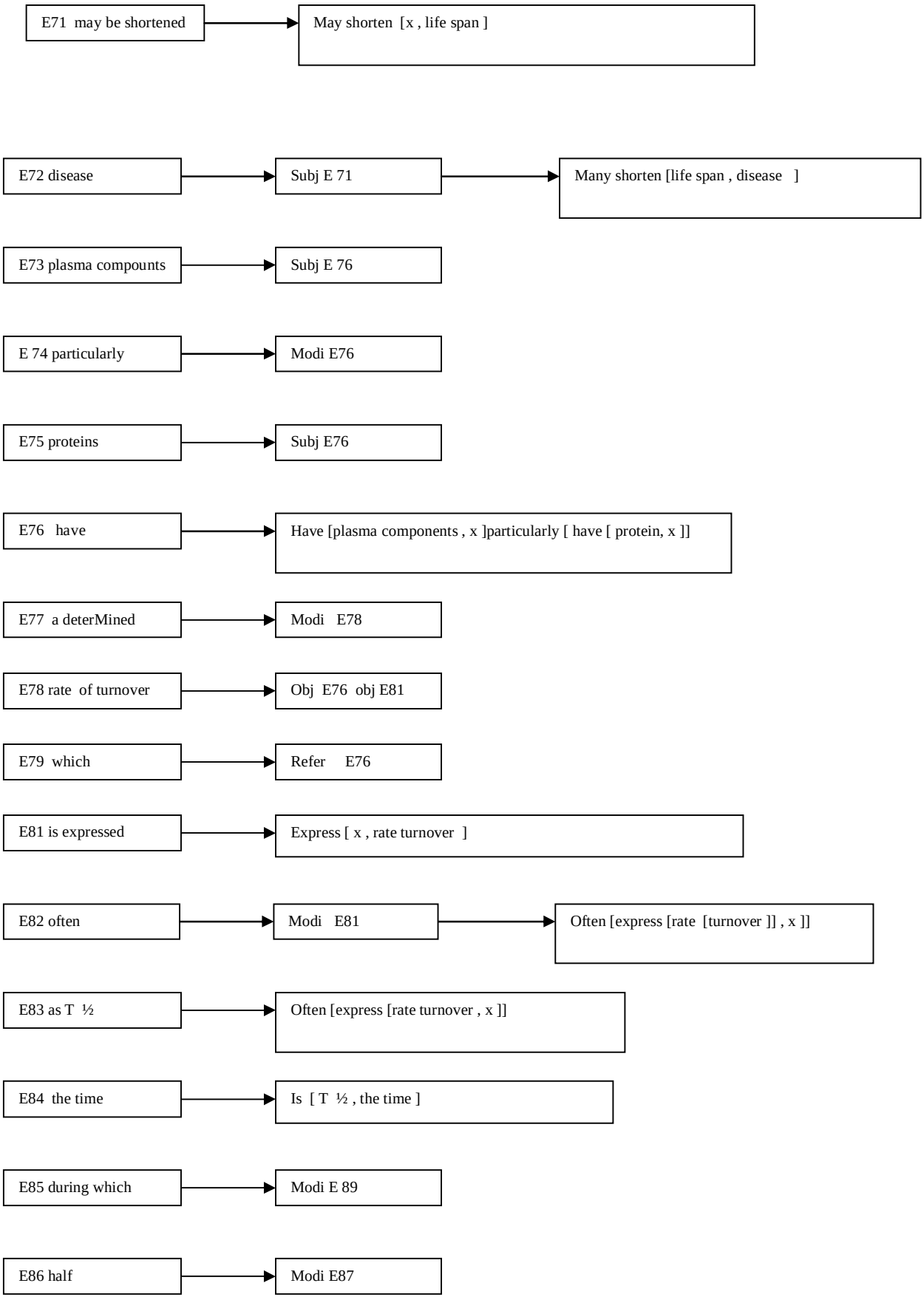
Appendix IV: the propositionalization of text A

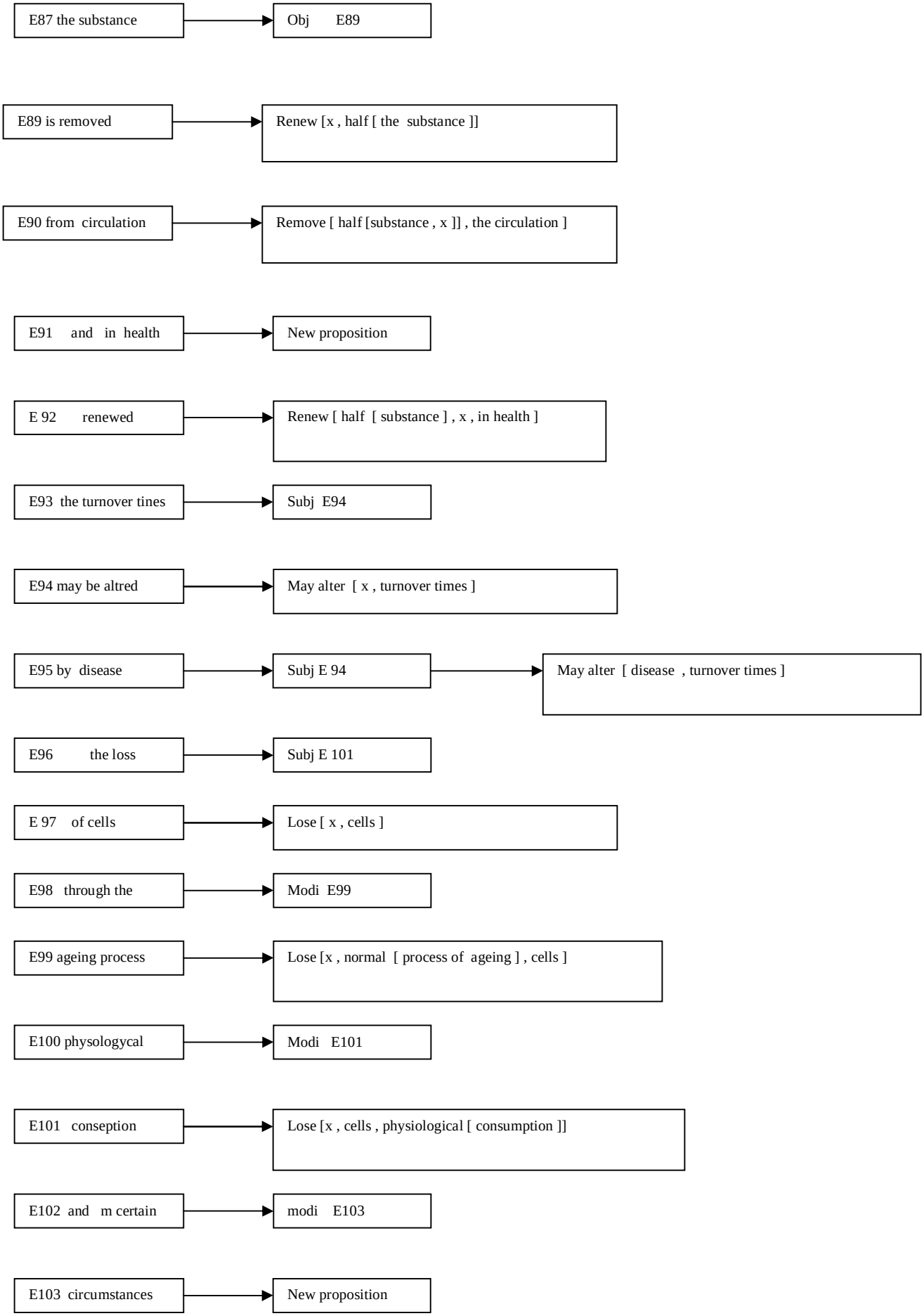


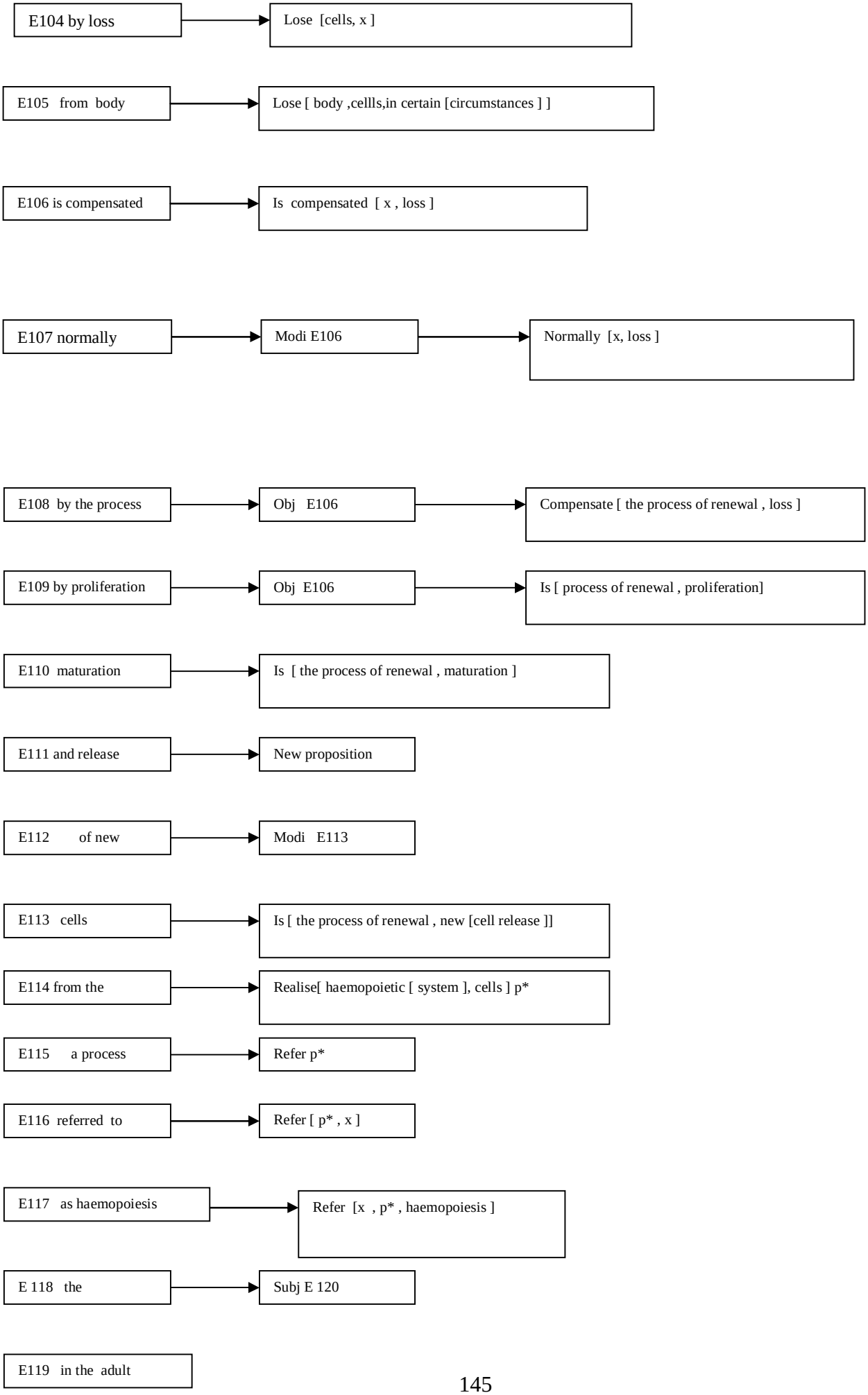

E18 plasma
Is [40 ml , plasma]
E19 the cells
Subj E20 and E 32
E 20 are
Are [the cells , x]
E21 heterogenous
Are [the cells , heterogenous]
E 23 consist of
Consist of [cells , x]
E24 Erythrocytes
Consist of [cells , erythrocyte]
E25 which
Refer E24
E26 are
Are [erythrocytes , x]
E27 disk
Modi E 28
E28 shaped
Obj E 26
Are [erythrocytes, disk [shaped]]
E29 non-nucleated
Obj E 26
Are [erythrocytes , non –nucleated]
E30 non-motile
Obj E26
Are [erythrocytes , non –motile]
E31 and
New proposition
E32 contain
Contain [cells , x]]
E33 heamoglobin
Obj E32
Contain [cells , heamoglobin]
E34 the nucleated
Modi E35
E35 motile
Modi E 36

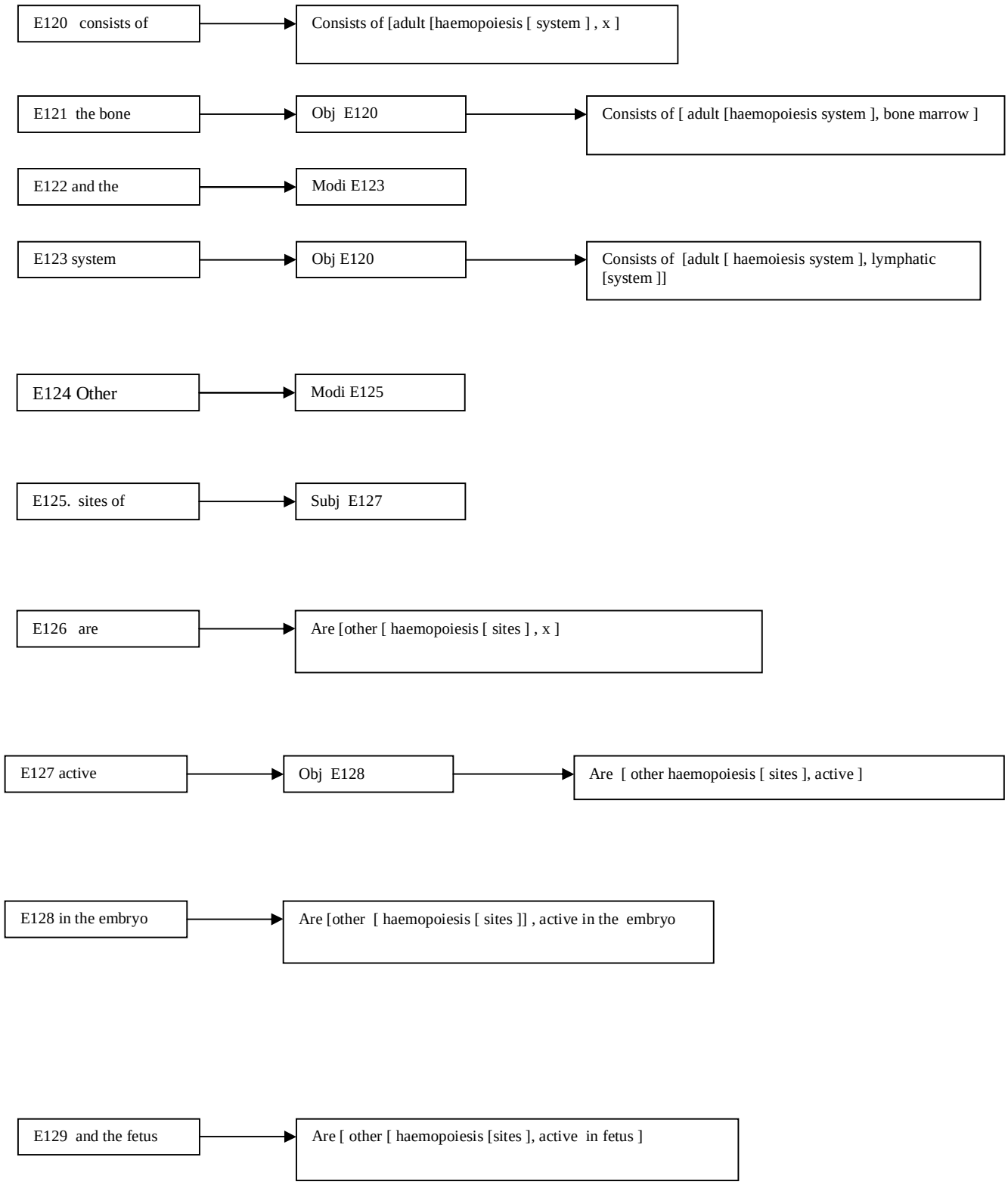

E36 leucocytes
Obj E 32
Contain [cells , the nucleated [motile [leucocytes]]
E37 and the platelets
Obj E32
Contain [cells , platelets]
E38 the leucocytes
Obj E39
E39 are divided
Divided [leucocytes , x]
E40 further
Modi E39
Further [divided [x , leucocytes]]
E41 into granulocytes
Subj E42
Further [divide [x , leucocytes , granulocytes]]
E 42 comprise
Comprise
E43 neutrophils
Obj E 42
Comprise [granulocytes , neutrophils]
E44 eosinophil
Obj E42
Comprise [granulocytes , basophils]
E 45 basophils
Obj E 42
Comprise [granulacytes , basophils]
E46 lymphocytes
Obj E39
Further [divide [x , leucocytes, lymphocytes]]
E47 monocytes
Obj E39
Fruther [x , leucocytes, monocytes]
E48 plasma
Subj E49
E49 contains
Contains [plasma , x]
E50 many
Modi E 51
E52 and
New proposition
E53 inorganic
Modi E54


E54 compounds
E54 compounds
Contains [plasma , many [organic compounds]]
Contains [plasma , many [unorganic compounds]]
E55 notably
Mod E49
E56 protein
Obj E49
Notably [Contain [plasma , proteins]]
E57 electrolytes
Obj E 49
Notably [contain [plasma , electrolytes]]
E58 substances
Obj E49 Obj E59
Notably [contain [plasma , substances , x]]
E59 absorbed
Absorb [x , substances]
E60 from
Modi E61
E61 tract
Subj E 59
Absorb [substances , gastrointestinal [tract]]
E62 and products
E63 of metabolism
Obj E49
Metabolism [has , products]
E64 all
Modi E66
E 65 blood cells
Subj E67
E67 have
Have [blood cells , x
E68 a finite
Modi E69
E 69 life span
Obj E 67
have [blood cells , finite [life span]]
E70 which
Refer E69

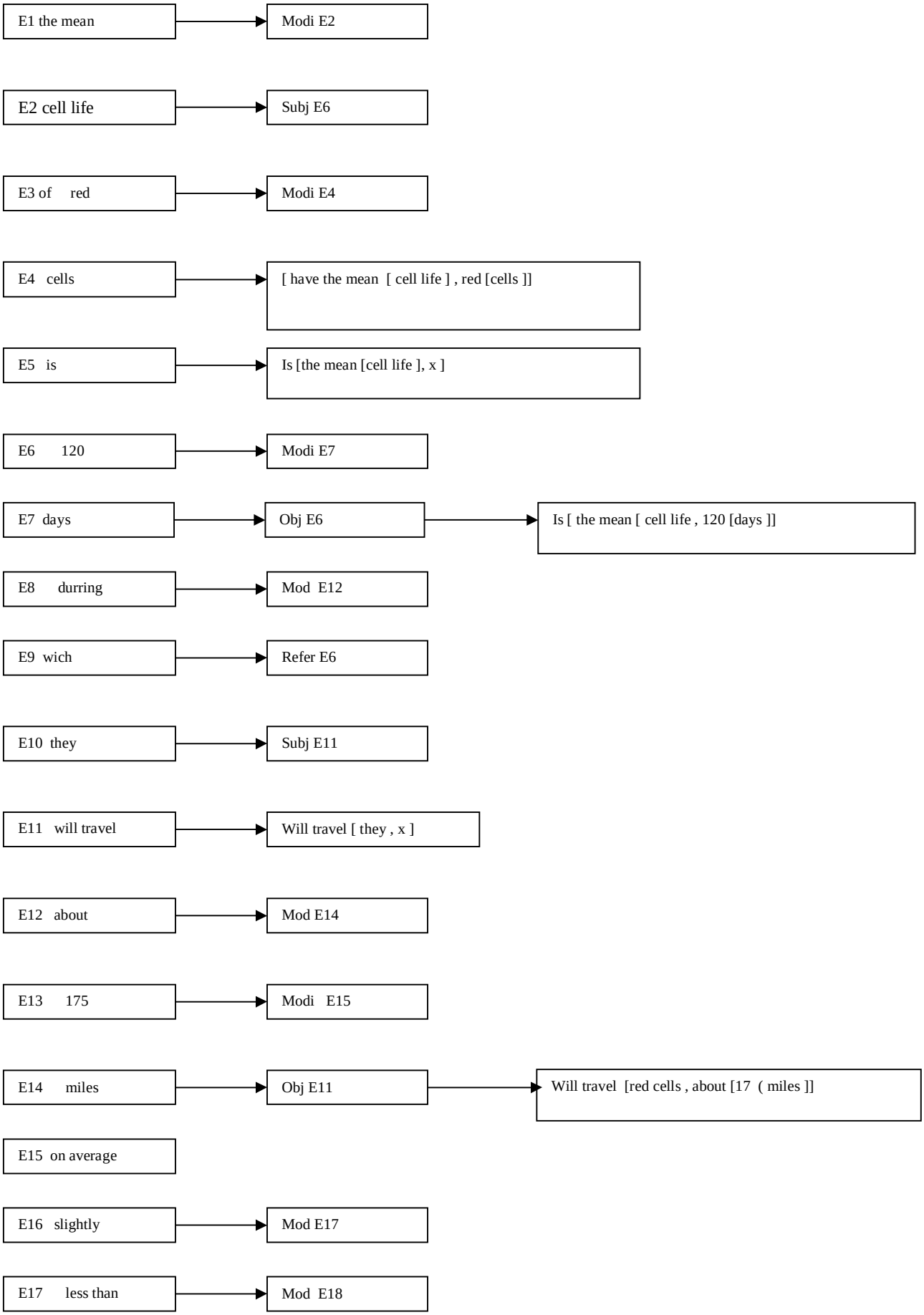

E71 may be shortened
May shorten [x , life span]
E72 disease
Subj E 71
Many shorten [life span , disease]
E73 plasma compounts
Subj E 76
E 74 particularly
Modi E76
E75 proteins
Subj E76
E76 have
Have [plasma components , x]particularly [have [protein, x]]
E77 a deterMined
Modi E78
E78 rate of turnover
Obj E76 obj E81
E79 which
Refer E76
E81 is expressed
Express [x , rate turnover]
E82 often
Modi E81
Often [express [rate [turnover]] , x]]
E83 as T ½
Often [express [rate turnover , x]]
E84 the time
Is [T ½ , the time]
E85 during which
Modi E 89
E86 half
Modi E87

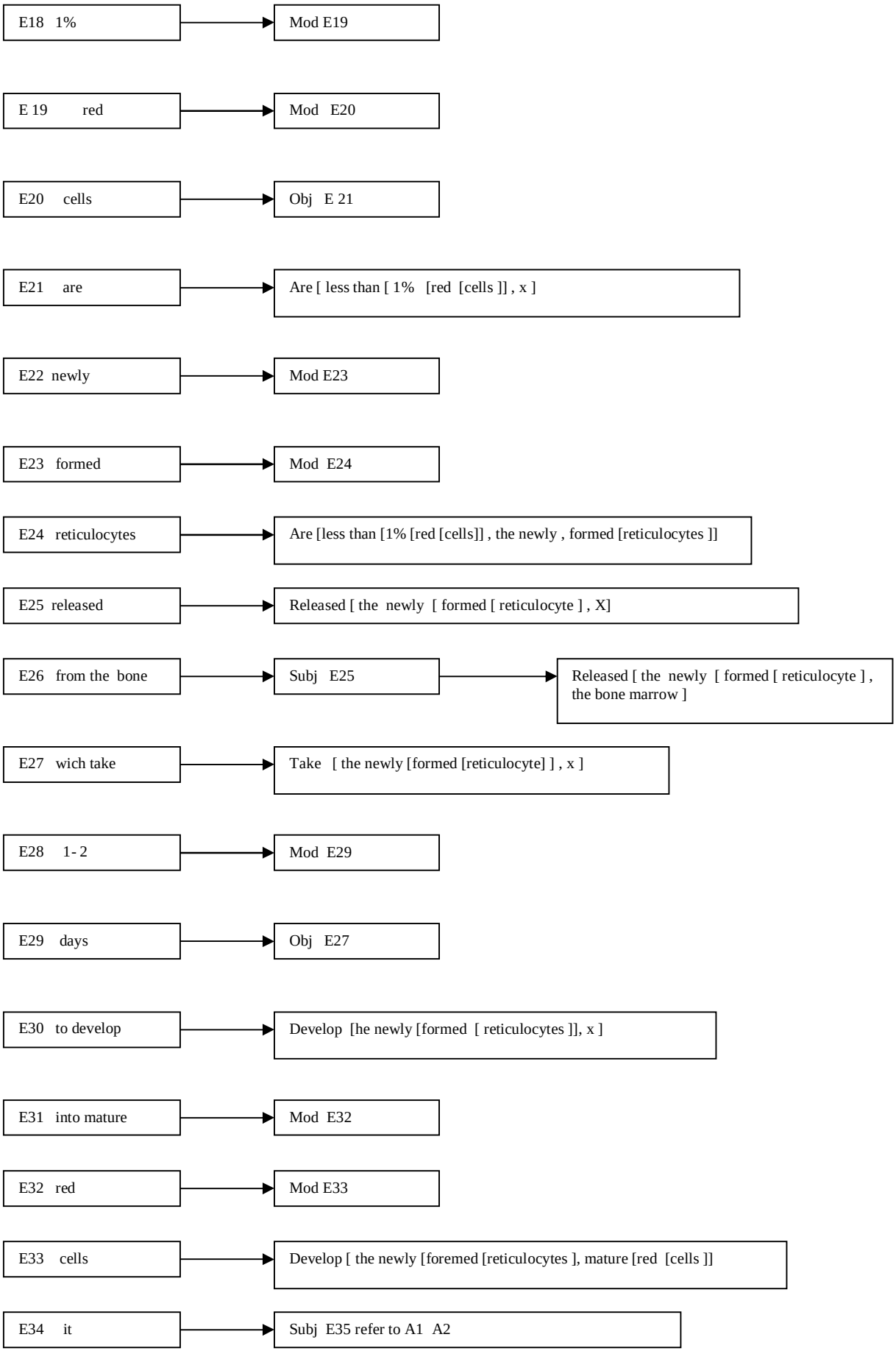

E87 the substance
Obj E89
E89 is removed
Renew [x , half [the substance]]
E90 from circulation
Remove [half [substance , x]] , the circulation]
E91 and in health
New proposition
E 92 renewed
Renew [half [substance] , x , in health]
E93 the turnover tines
Subj E94
E94 may be altred
May alter [x , turnover times]
E95 by disease
Subj E 94
May alter [disease , turnover times]
E96 the loss
Subj E 101
E 97 of cells
Lose [x , cells]
E98 through the
Modi E99
E99 ageing process
Lose [x , normal [process of ageing] , cells]
E100 physologycal
Modi E101
E101 conseption
Lose [x , cells , physiological [consumption]]
E102 and m certain
modi E103
E103 circumstances
New proposition

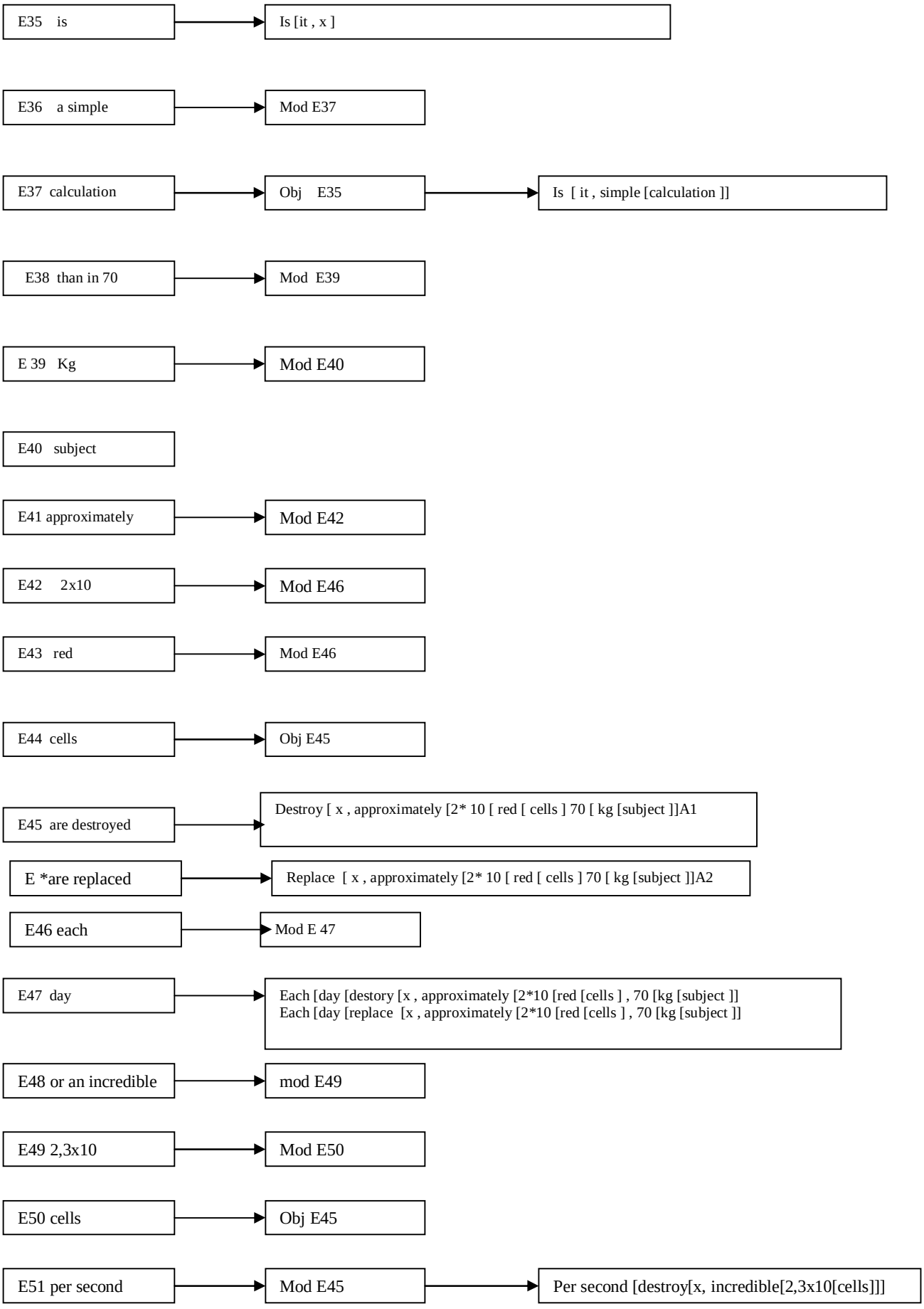

E104 by loss
Lose [cells, x]
E105 from body
Lose [body ,cellls,in certain [circumstances]]
E106 is compensated
Is compensated [x , loss]
E107 normally
Modi E106
Normally [x, loss]
E108 by the process
Obj E106
Compensate [the process of renewal , loss]
E109 by proliferation
Obj E106
Is [process of renewal , proliferation]
E110 maturation
Is [the process of renewal , maturation]
E111 and release
New proposition
E112 of new
Modi E113
E113 cells
Is [the process of renewal , new [cell release]]
E114 from the
Realise[haemopoietic [system], cells] p*
E115 a process
Refer p*
E116 referred to
Refer [p* , x]
E117 as haemopoiesis
Refer [x , p* , haemopoiesis]
E 118 the
Subj E 120
E119 in the adult

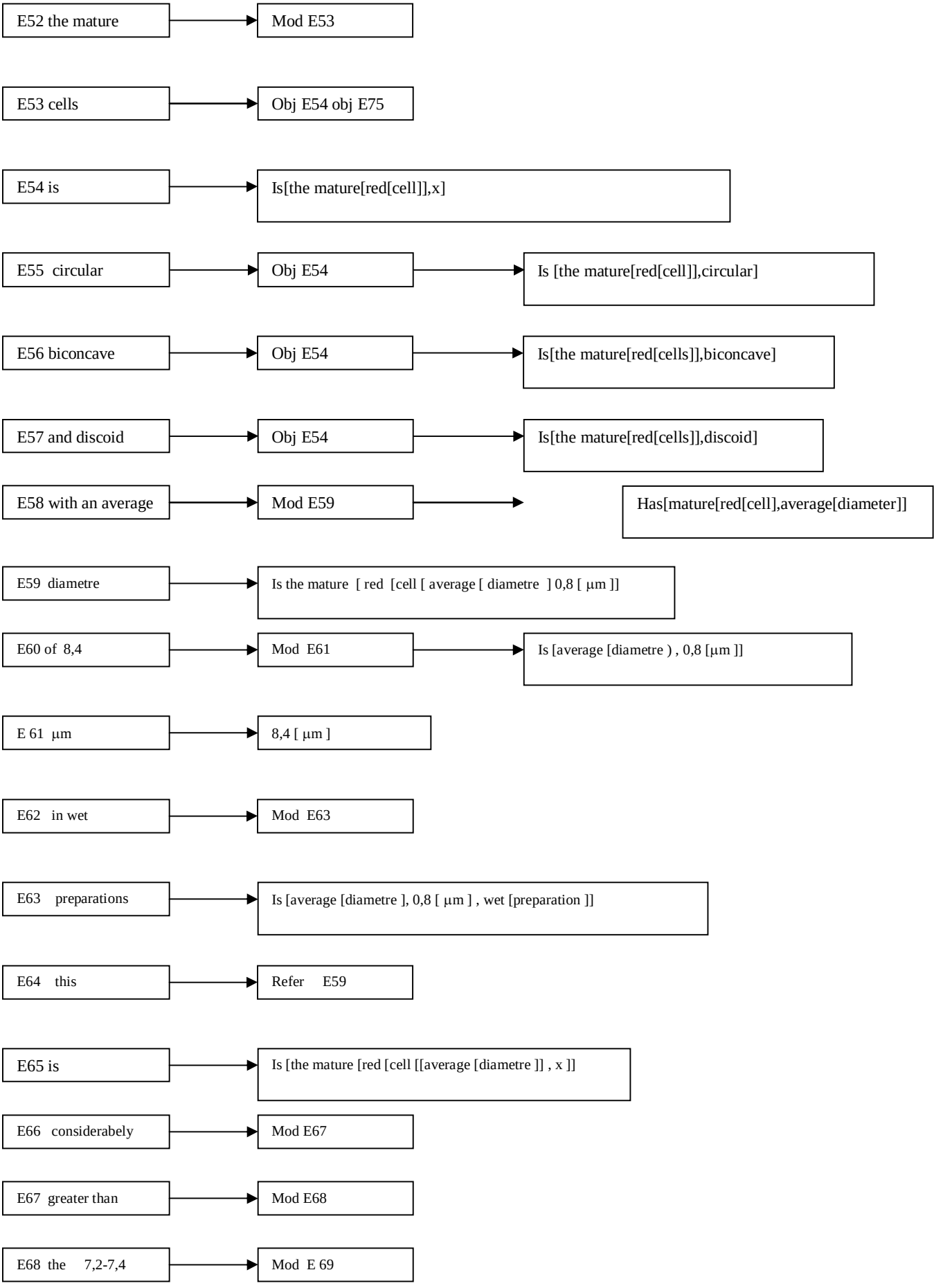

E120 consists of
Consists of [adult [haemopoiesis [system] , x]
E121 the bone
Obj E120
Consists of [adult [haemopoiesis system], bone marrow]
E122 and the
Modi E123
E123 system
Obj E120
Consists of [adult [haemoiesis system], lymphatic [system]]
E124 Other
Modi E125
E125. sites of
Subj E127
E126 are
Are [other [haemopoiesis [sites] , x]
E127 active
Obj E128
Are [other haemopoiesis [sites], active]
E128 in the embryo
Are [other [haemopoiesis [sites]] , active in the embryo
E129 and the fetus
Are [other [haemopoiesis [sites], active in fetus]

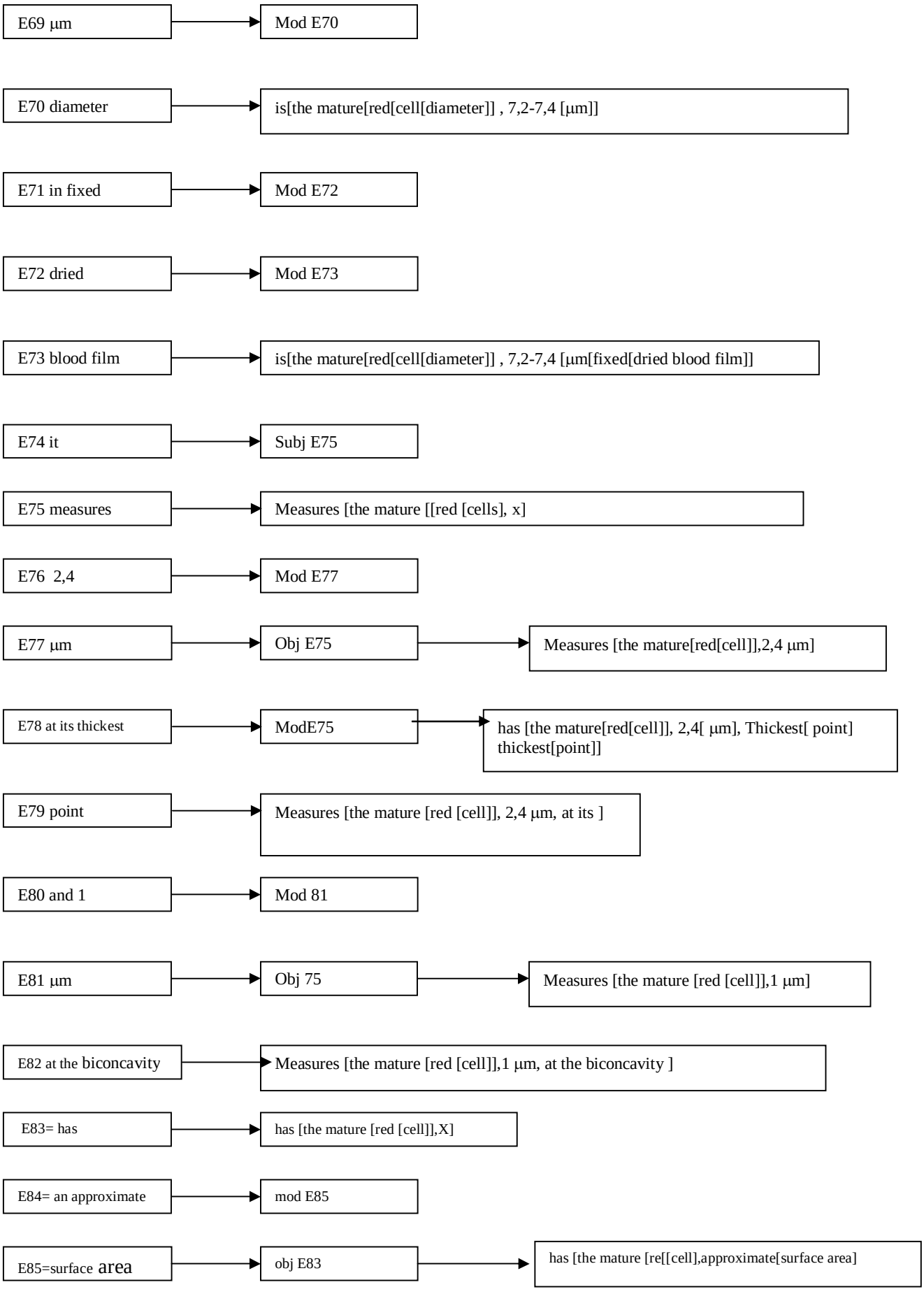
Appendix V :the propositionalization of text B

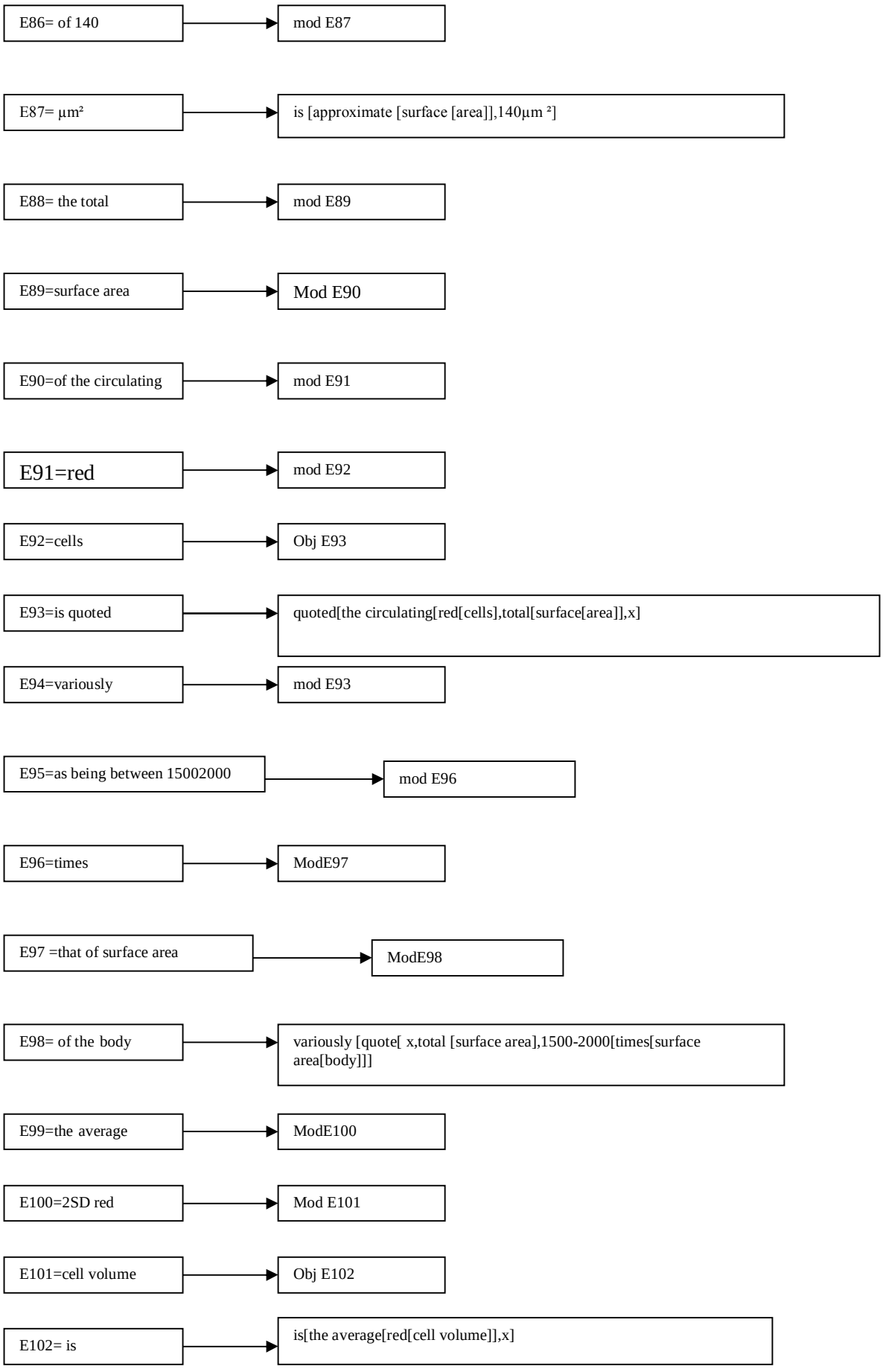


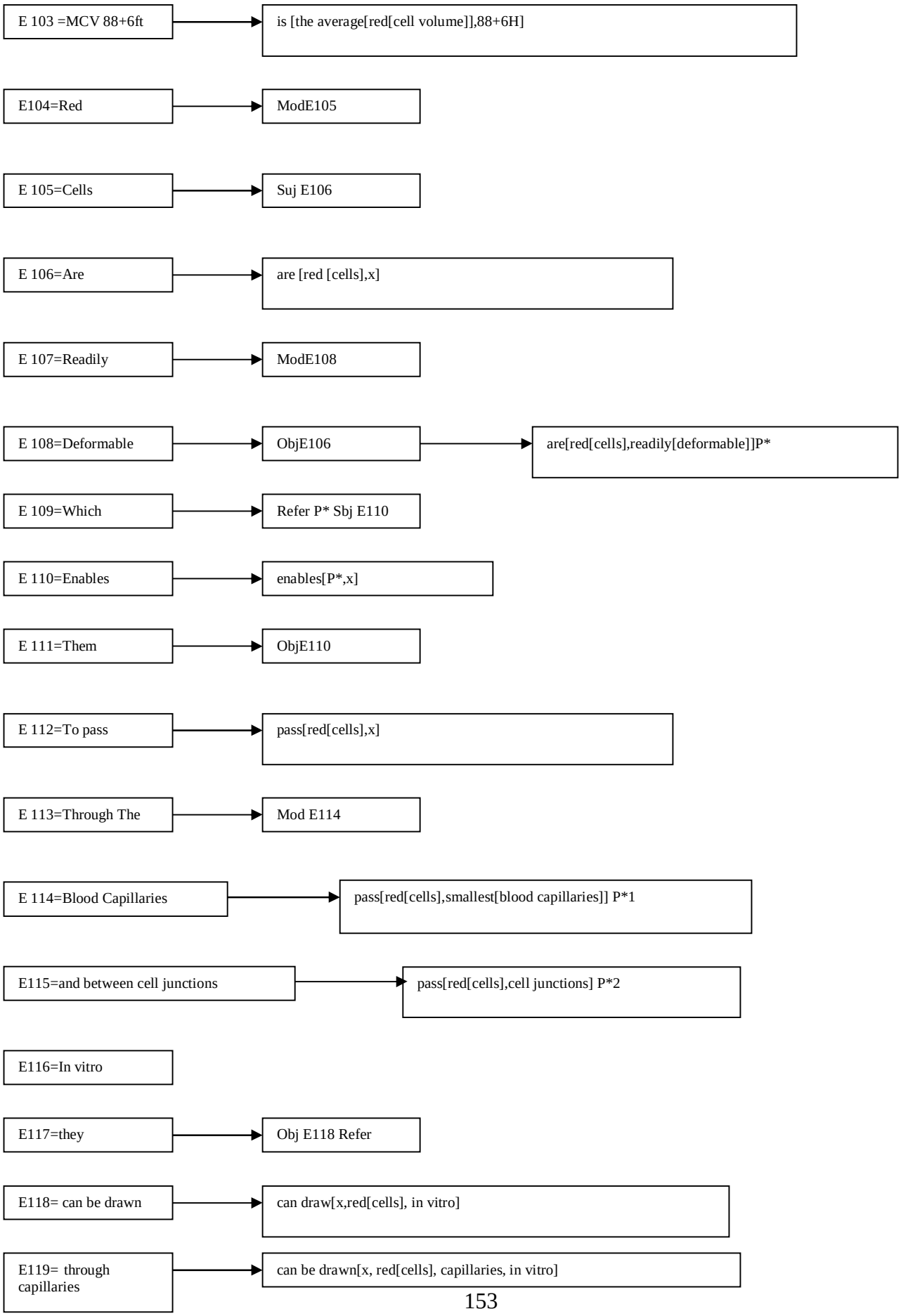

E18 1%
Mod E19
E 19 red
Mod E20
E20 cells
Obj E 21
E21 are
Are [less than [1% [red [cells]] , x]
E22 newly
Mod E23
E23 formed
Mod E24
E24 reticulocytes
Are [less than [1% [red [cells]] , the newly , formed [reticulocytes]]
E25 released
Released [the newly [formed [reticulocyte] , X]
E26 from the bone
Subj E25
Released [the newly [formed [reticulocyte] , the bone marrow]
E27 wich take
Take [the newly [formed [reticulocyte]] , x]
E28 1- 2
Mod E29
E29 days
Obj E27
E30 to develop
Develop [he newly [formed [reticulocytes]], x]
E31 into mature
Mod E32
E32 red
Mod E33
E33 cells
Develop [the newly [foremed [reticulocytes], mature [red [cells]]
E34 it
Subj E35 refer to A1 A2

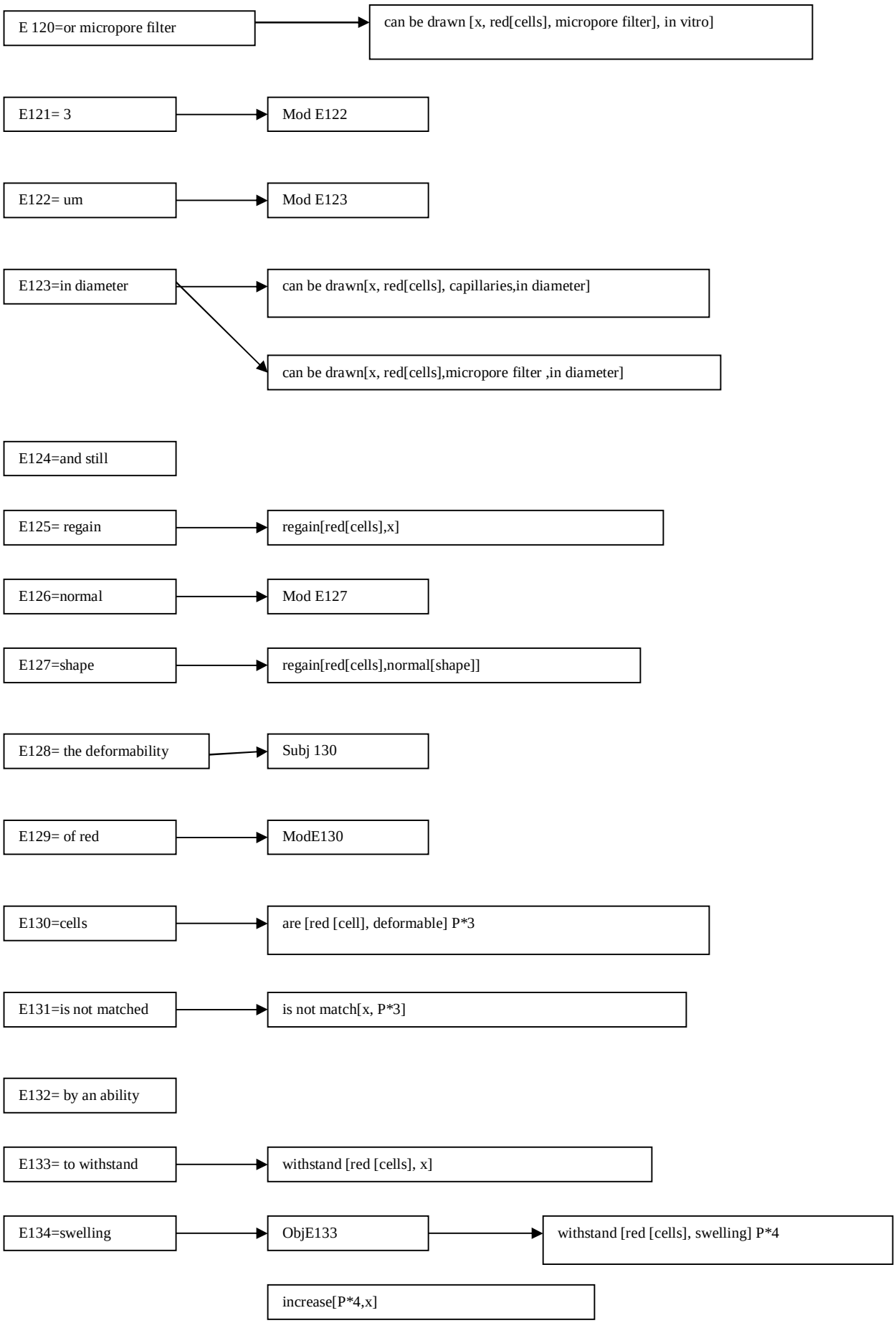

E35 is
Is [it , x]
E36 a simple
Mod E37
E37 calculation
Obj E35
Is [it , simple [calculation]]
E38 than in 70
Mod E39
E 39 Kg
Mod E40
E40 subject
E41 approximately
Mod E42
E42 2x10
Mod E46
E43 red
Mod E46
E44 cells
Obj E45
E45 are destroyed
Destroy [x , approximately [2* 10 [red [cells] 70 [kg [subject]]A1
E *are replaced
Replace [x , approximately [2* 10 [red [cells] 70 [kg [subject]]A2
E46 each
Mod E 47
E47 day
Each [day [destory [x , approximately [2*10 [red [cells] , 70 [kg [subject]]
Each [day [replace [x , approximately [2*10 [red [cells] , 70 [kg [subject]]
E48 or an incredible
mod E49
E49 2,3x10
Mod E50
E50 cells
Obj E45
E51 per second
Mod E45
Per second [destroy[x, incredible[2,3x10[cells]]]

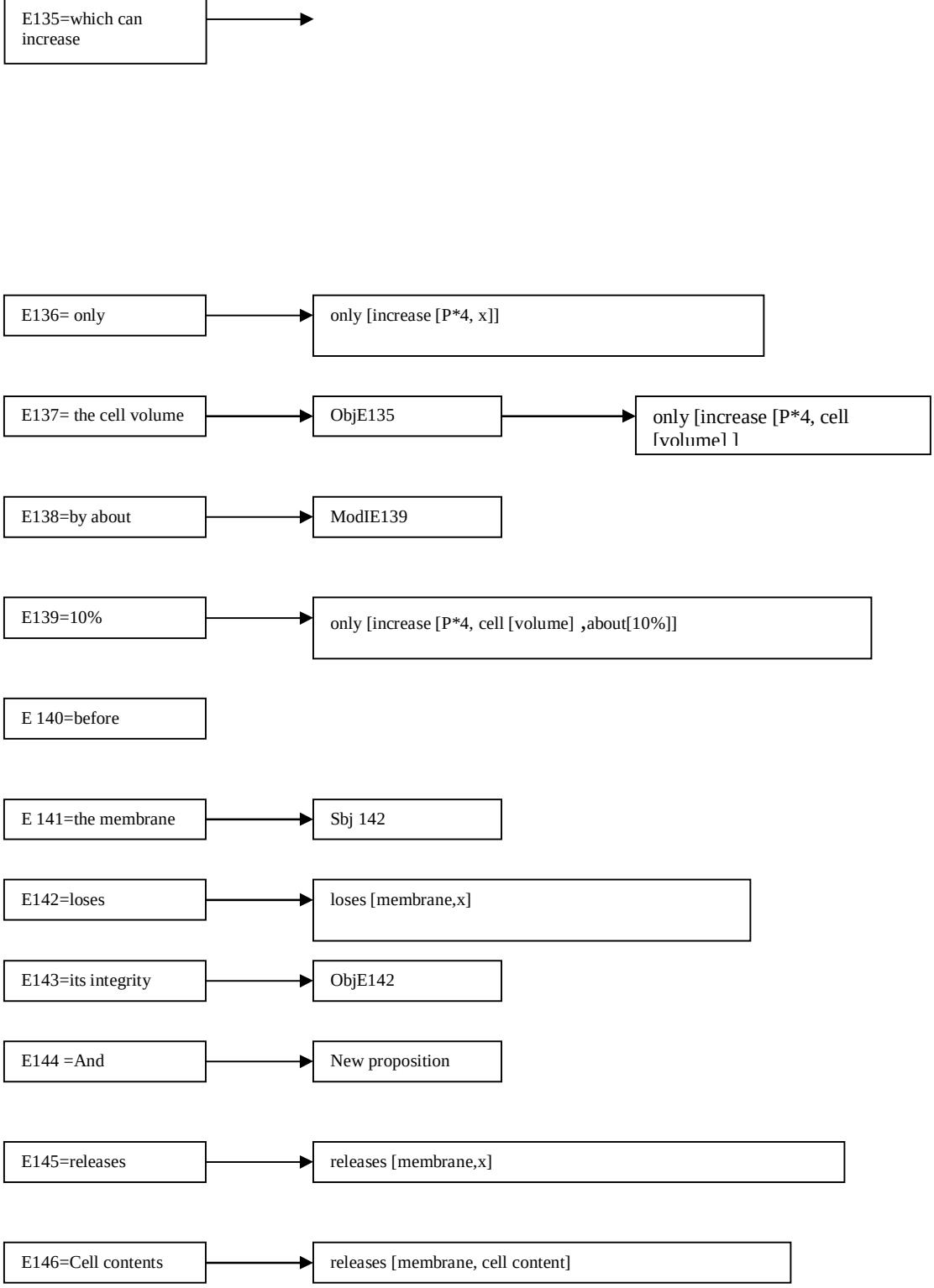

E52 the mature
Mod E53
E53 cells
Obj E54 obj E75
E54 is
Is[the mature[red[cell]],x]
E55 circular
Obj E54
Is [the mature[red[cell]],circular]
E56 biconcave
Obj E54
Is[the mature[red[cells]],biconcave]
E57 and discoid
Obj E54
Is[the mature[red[cells]],discoid]
E58 with an average
Mod E59
Has[mature[red[cell],average[diameter]]
E59 diametre
Is the mature [red [cell [average [diametre] 0,8 [µm]]
E60 of 8,4
Mod E61
Is [average [diametre) , 0,8 [µm]]
E 61 µm
8,4 [µm]
E62 in wet
Mod E63
E63 preparations
Is [average [diametre], 0,8 [µm] , wet [preparation]]
E64 this
Refer E59
E65 is
Is [the mature [red [cell [[average [diametre]] , x]]
E66 considerabely
Mod E67
E67 greater than
Mod E68
E68 the 7,2-7,4
Mod E 69


E69 μm
Mod E70
E70 diameter
is[the mature[red[cell[diameter]] , 7,2-7,4 [μm]]
E71 in fixed
Mod E72
E72 dried
Mod E73
E73 blood film
is[the mature[red[cell[diameter]] , 7,2-7,4 [μm[fixed[dried blood film]]
E74 it
Subj E75
E75 measures
Measures [the mature [[red [cells], x]
E76 2,4
Mod E77
E77 μm
Obj E75
Measures [the mature[red[cell]],2,4 μm]
E78 at its thickest
ModE75
has [the mature[red[cell]], 2,4[μm], Thickest[point] thickest[point]]
E79 point
Measures [the mature [red [cell]], 2,4 μm, at its]
E80 and 1
Mod 81
E81 μm
Obj 75
Measures [the mature [red [cell]],1 μm]
E82 at the biconcavity
Measures [the mature [red [cell]],1 μm, at the biconcavity]
E83= has
has [the mature [red [cell]],X]
E84= an approximate
mod E85
E85=surface area
obj E83
has [the mature [re[[cell],approximate[surface area]

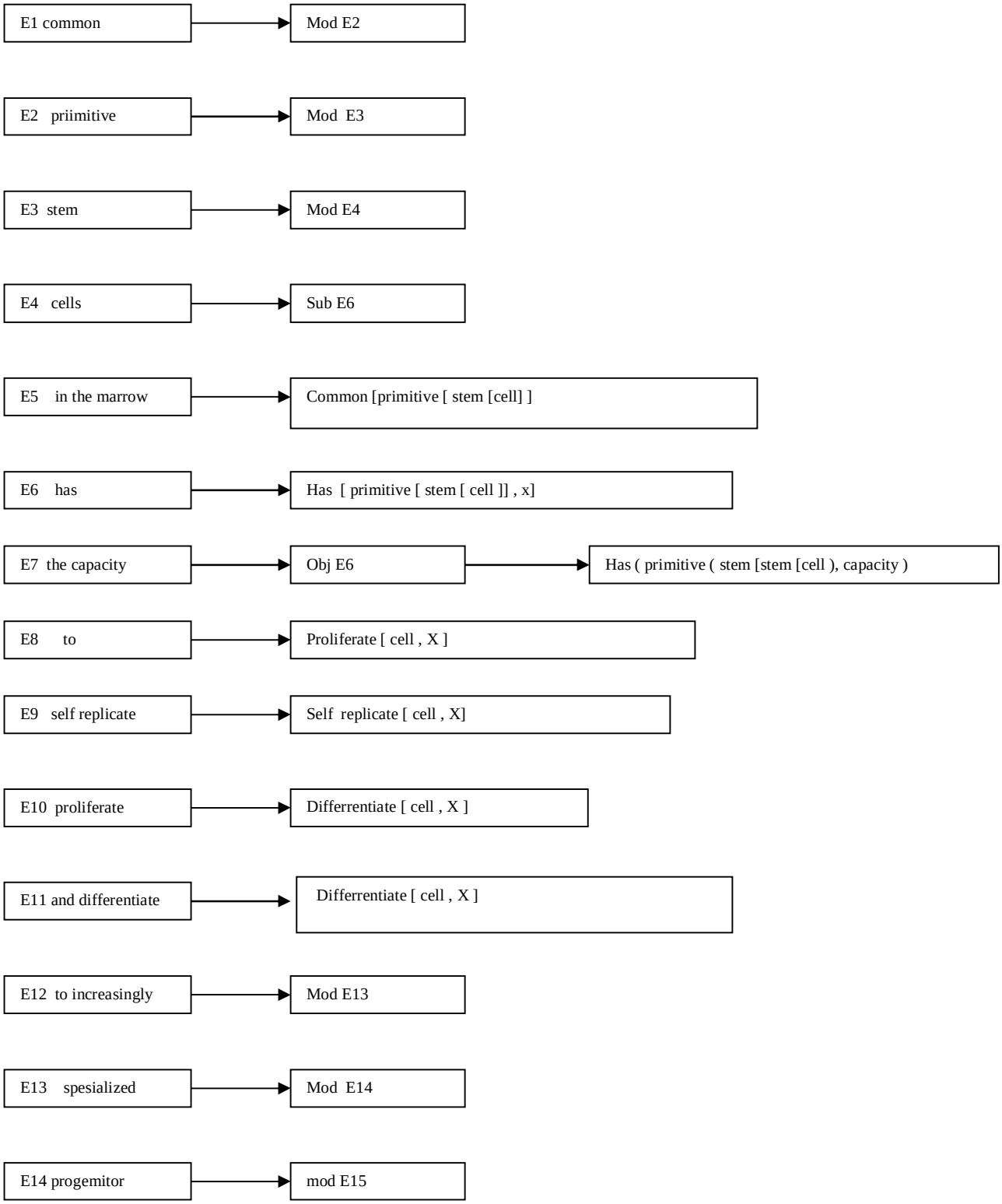

E86= of 140
mod E87
E87= µm²
is [approximate [surface [area]],140µm ²]
E88= the total
mod E89
E89=surface area
Mod E90
E90=of the circulating
mod E91
E91=red
mod E92
E92=cells
Obj E93
E93=is quoted
quoted[the circulating[red[cells],total[surface[area]],x]
E94=variously
mod E93
E95=as being between 15002000
mod E96
E96=times
ModE97
E97 =that of surface area
ModE98
E98= of the body
variously [quote[x,total [surface area],1500-2000[times[surface area[body]]]
E99=the average
ModE100
E100=2SD red
Mod E101
E101=cell volume
Obj E102
E102= is
is[the average[red[cell volume]],x]

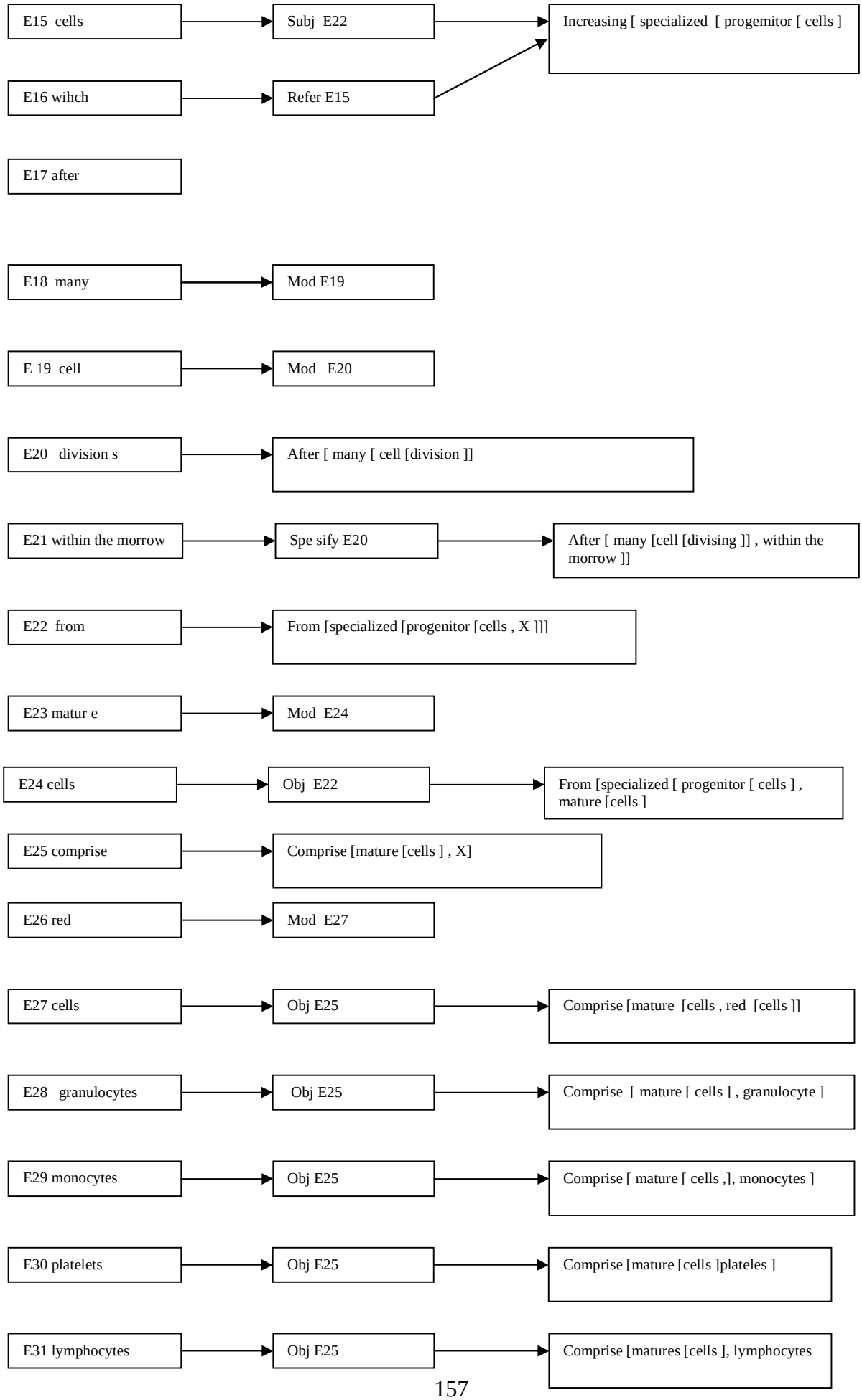

E 103 =MCV 88+6ft
is [the average[red[cell volume]],88+6H]
E104=Red
ModE105
E 105=Cells
Suj E106
E 106=Are
are [red [cells],x]
E 107=Readily
ModE108
E 108=Deformable
ObjE106
are[red[cells],readily[deformable]]P*
E 109=Which
Refer P* Sbj E110
E 110=Enables
enables[P*,x]
E 111=Them
ObjE110
E 112=To pass
pass[red[cells],x]
E 113=Through The
Mod E114
E 114=Blood Capillaries
pass[red[cells],smallest[blood capillaries]] P*1
E115=and between cell junctions
pass[red[cells],cell junctions] P*2
E116=In vitro
E117=they
Obj E118 Refer
E118= can be drawn
can draw[x,red[cells], in vitro]
E119= through capillaries
can be drawn[x, red[cells], capillaries, in vitro]

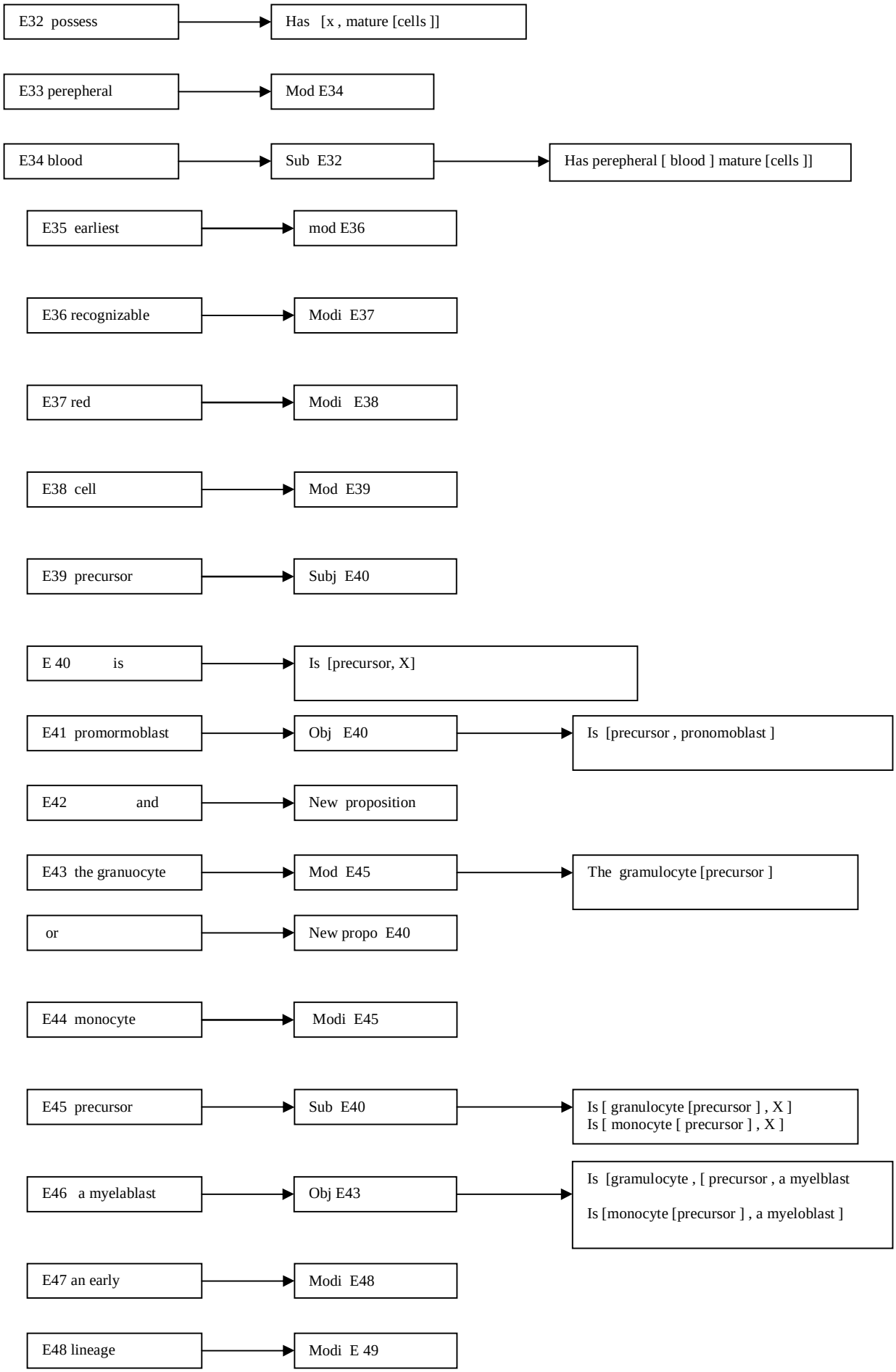

E 120=or micropore filter
can be drawn [x, red[cells], micropore filter], in vitro]
E121= 3
Mod E122
E122= um
Mod E123
E123=in diameter
can be drawn[x, red[cells], capillaries,in diameter]
can be drawn[x, red[cells],micropore filter ,in diameter]
E124=and still
E125= regain
regain[red[cells],x]
E126=normal
Mod E127
E127=shape
regain[red[cells],normal[shape]]
E128= the deformability
Subj 130
E129= of red
ModE130
E130=cells
are [red [cell], deformable] P*3
E131=is not matched
is not match[x, P*3]
E132= by an ability
E133= to withstand
withstand [red [cells], x]
E134=swelling
ObjE133
withstand [red [cells], swelling] P*4
increase[P*4,x]

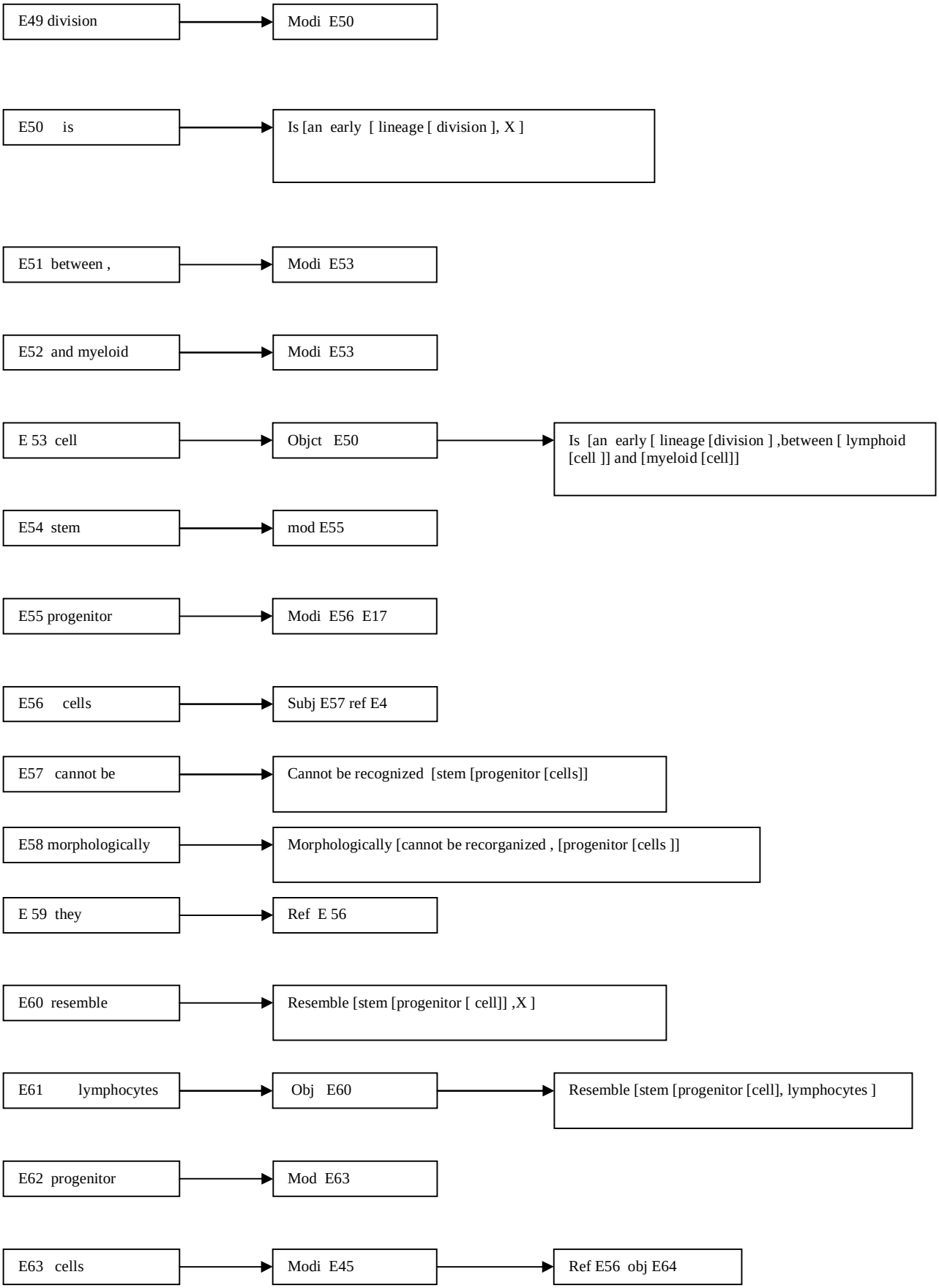

E135=which can increase
E136= only
only [increase [P*4, x]]
E137= the cell volume
ObjE135
only [increase [P*4, cell [volume]]
E138=by about
ModIE139
E139=10%
only [increase [P*4, cell [volume] ,about[10%]]
E 140=before
E 141=the membrane
Sbj 142
E142=loses
loses [membrane,x]
E143=its integrity
ObjE142
E144 =And
New proposition
E145=releases
releases [membrane,x]
E146=Cell contents
releases [membrane, cell content]

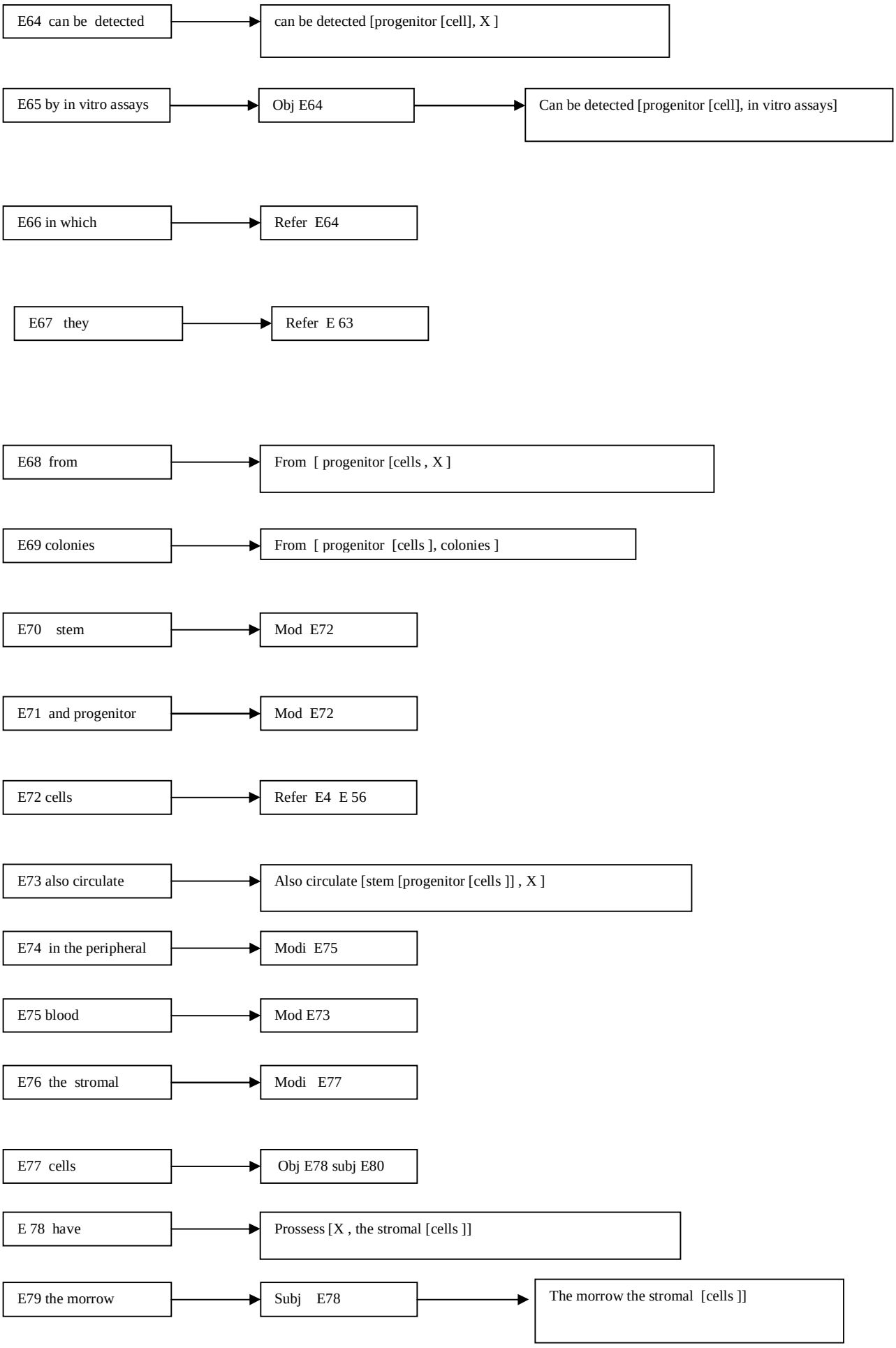
Appendix VI: the proposotionalization of text C

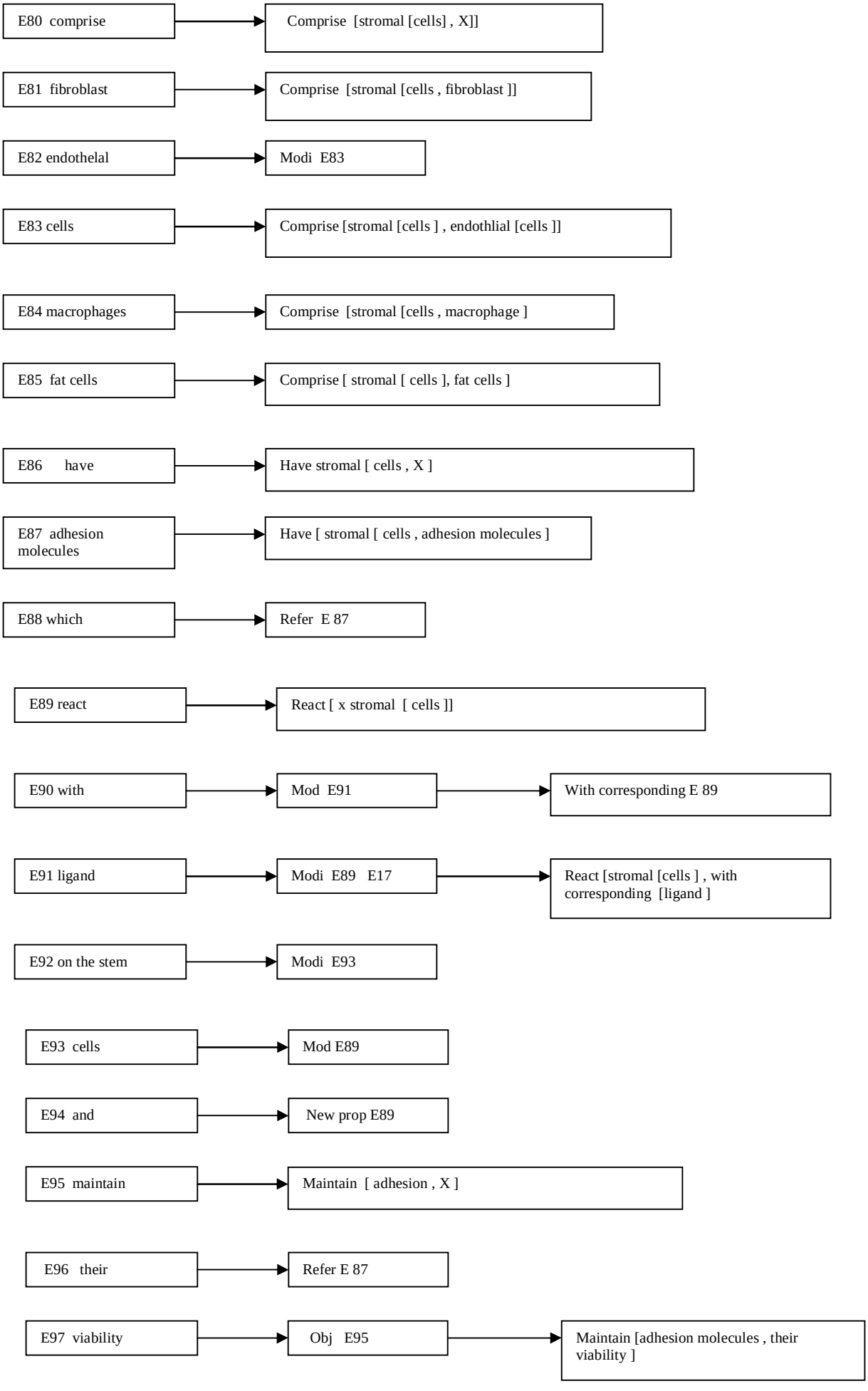



E15 cells
Subj E22
Increasing [specialized [progemitor [cells]
E16 wihch
Refer E15
E17 after
E18 many
Mod E19
E 19 cell
Mod E20
E20 division s
After [many [cell [division]]
E21 within the morrow
Spe sify E20
After [many [cell [divising]] , within the morrow]]
E22 from
From [specialized [progenitor [cells , X]]]
E23 matur e
Mod E24
E24 cells
Obj E22
From [specialized [progenitor [cells] , mature [cells]
E25 comprise
Comprise [mature [cells] , X]
E26 red
Mod E27
E27 cells
Obj E25
Comprise [mature [cells , red [cells]]
E28 granulocytes
Obj E25
Comprise [mature [cells] , granulocyte]
E29 monocytes
Obj E25
Comprise [mature [cells ,], monocytes]
E30 platelets
Obj E25
Comprise [mature [cells]plateles]
E31 lymphocytes
Obj E25
Comprise [matures [cells], lymphocytes

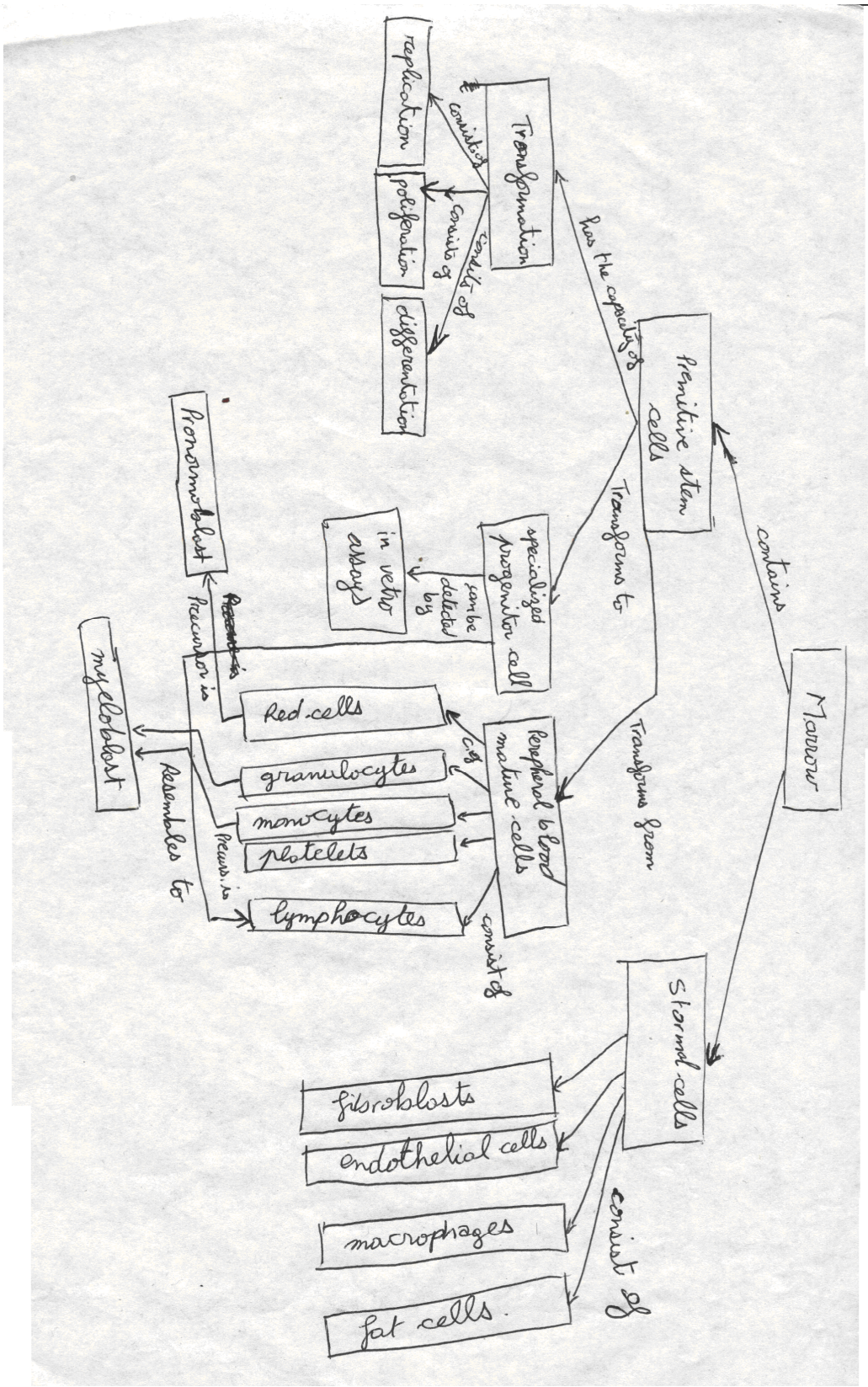

E32 possess
Has [x , mature [cells]]
E33 perepheral
Mod E34
E34 blood
Sub E32
Has perepheral [blood] mature [cells]]
E35 earliest
mod E36
E36 recognizable
Modi E37
E37 red
Modi E38
E38 cell
Mod E39
E39 precursor
Subj E40
E 40 is
Is [precursor, X]
E41 promormoblast
Obj E40
Is [precursor , pronomoblast]
E42 and
New proposition
E43 the granuocyte
Mod E45
The gramulocyte [precursor]
or
New propo E40
E44 monocyte
Modi E45
E45 precursor
Sub E40
Is [granulocyte [precursor] , X]
Is [monocyte [precursor] , X]
E46 a myelablast
Obj E43
Is [gramulocyte , [precursor , a myelblast
Is [monocyte [precursor] , a myeloblast]
E47 an early
Modi E48
E48 lineage
Modi E 49


E49 division
Modi E50
E50 is
Is [an early [lineage [division], X]
E51 between ,
Modi E53
E52 and myeloid
Modi E53
E 53 cell
Objct E50
Is [an early [lineage [division] ,between [lymphoid [cell]] and [myeloid [cell]]
E54 stem
mod E55
E55 progenitor
Modi E56 E17
E56 cells
Subj E57 ref E4
E57 cannot be
Cannot be recognized [stem [progenitor [cells]]
E58 morphologically
Morphologically [cannot be recorganized , [progenitor [cells]]
E 59 they
Ref E 56
E60 resemble
Resemble [stem [progenitor [cell]] ,X]
E61 lymphocytes
Obj E60
Resemble [stem [progenitor [cell], lymphocytes]
E62 progenitor
Mod E63
E63 cells
Modi E45
Ref E56 obj E64


E64 can be detected
can be detected [progenitor [cell], X]
E65 by in vitro assays
Obj E64
Can be detected [progenitor [cell], in vitro assays]
E66 in which
Refer E64
E67 they
Refer E 63
E68 from
From [progenitor [cells , X]
E69 colonies
From [progenitor [cells], colonies]
E70 stem
Mod E72
E71 and progenitor
Mod E72
E72 cells
Refer E4 E 56
E73 also circulate
Also circulate [stem [progenitor [cells]] , X]
E74 in the peripheral
Modi E75
E75 blood
Mod E73
E76 the stromal
Modi E77
E77 cells
Obj E78 subj E80
E 78 have
Prossess [X , the stromal [cells]]
E79 the morrow
Subj E78
The morrow the stromal [cells]]


E80 comprise
Comprise [stromal [cells] , X]]
E81 fibroblast
Comprise [stromal [cells , fibroblast]]
E82 endothelal
Modi E83
E83 cells
Comprise [stromal [cells] , endothlial [cells]]
E84 macrophages
Comprise [stromal [cells , macrophage]
E85 fat cells
Comprise [stromal [cells], fat cells]
E86 have
Have stromal [cells , X]
E87 adhesion molecules
Have [stromal [cells , adhesion molecules]
E88 which
Refer E 87
E89 react
React [x stromal [cells]]
E90 with
Mod E91
With corresponding E 89
E91 ligand
Modi E89 E17
React [stromal [cells] , with corresponding [ligand]
E92 on the stem
Modi E93
E93 cells
Mod E89
E94 and
New prop E89
E95 maintain
Maintain [adhesion , X]
E96 their
Refer E 87
E97 viability
Obj E95
Maintain [adhesion molecules , their viability]

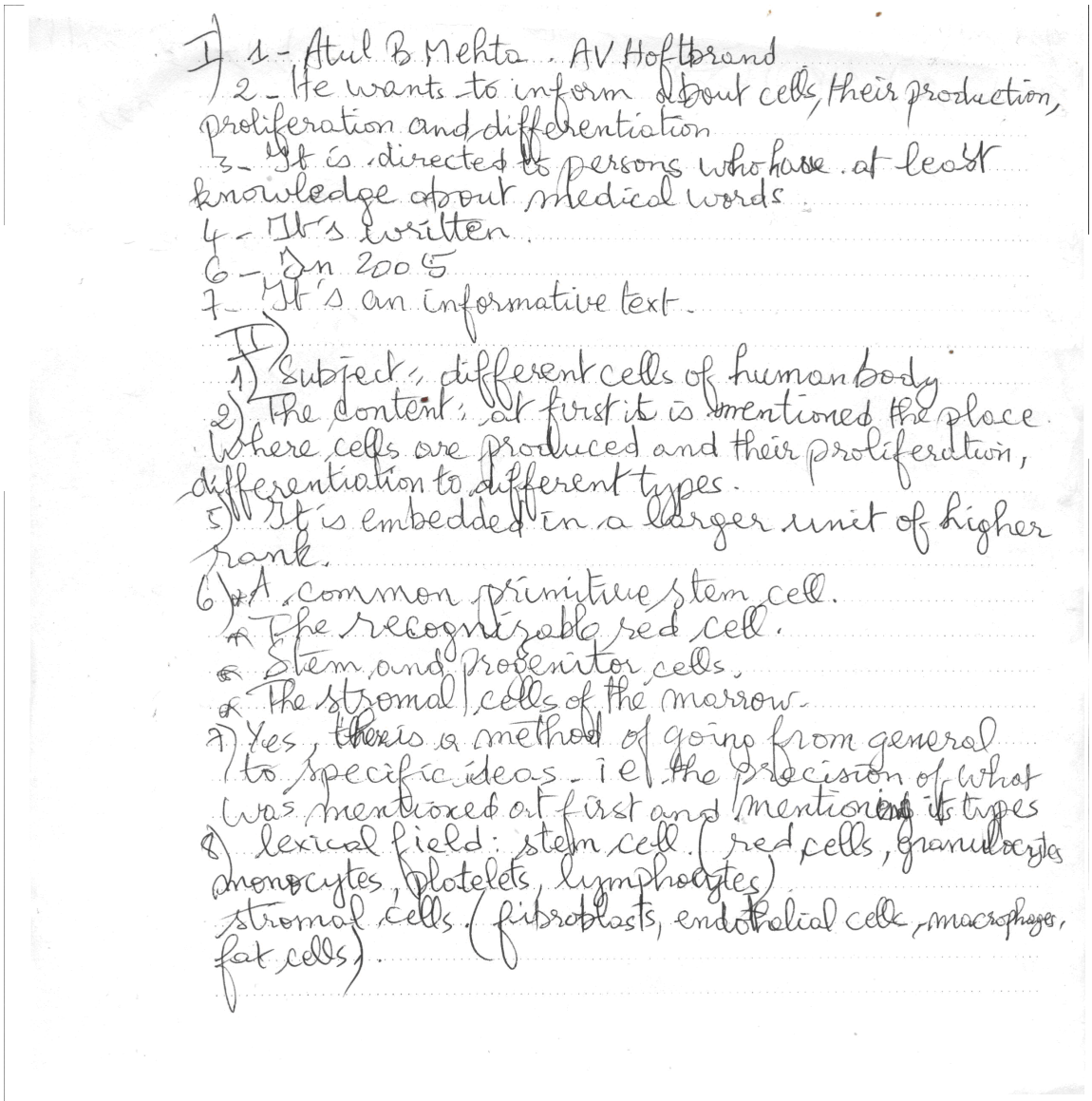
Appendix VII: an example of the translation of text C by a student from group A



تملك الخلية الجدعية البدائية في النخاع إمكانية التناسخ والتكاثر والتمايز الى خلايا أسلاف خاصة وذلك بشكل متزايد، وذلك بعد العديد من الانقسامات الخلوية داخل النخاع، منطلقة من خلايا بالغة بالدم السطحي (مثل الكريات الدموية الحمراء، الخلايا المحببة، الأحادية، الصفائح الدموية والخلايا اللمفاوية) (الصورة 12). ان الطريقة الحديثة التي يمكن التعرف عليها الكريات الدموية الحمراء هي سليفة الأرومة البسوية، أما الخلايا المحببة و أحادية النواة فطليعتها هي الأرومة النخاعية، أما الانقسام الخيطي الحديث فيكون بين الخلايا اللمفاوية والنخاعية. و لا يمكننا التعرف على كل من الخلايا الجذعية و خلايا الأسلاف مورفولوجيا؛ لأنها تشبه الخلايا اللمفاوية، و لكن يمكننا الكشف عليها عن طريق مقايسة مخبرية في الأنبوب لمجموعة من التجمعات. كذلك، فإن كلاً من الخلايا الجذعية و خلايا الأسلاف تنتقل في الدم السطحي.

ان الخلايا السدوية للنخاع (الأورمات الليفية، الخلايا البطانية، البلعمية الكبرى، الخلايا الدهنية) تملك جزيئات ملتصقة بها، هذه الأخيرة تتفاعل مع اللجين المناسب في الخلية الجدعية وبذلك تحافظ على حياتها.

Appendix VIII: an example of the translation of text C by a student from group B



I) 1- Atul B Mehta . AV Hoffbrand
2- He wants to inform about cells, their production, proliferation and differentiation
3- It is directed to persons who have at least knowledge about medical words
4- It's written
6- In 2005
7- It's an informative text.

II)
1) Subject: different cells of human body
2) The content: at first it is mentioned the place where cells are produced and their proliferation, differentiation to different types.
5) It is embedded in a larger unit of higher rank.
6) * A common primitive stem cell.
* The recognizable red cell.
* Stem and progenitor cells.
* The stromal cells of the marrow.
7) Yes, there is a method of going from general to specific ideas - i e the precision of what was mentioned at first and mentioning its types
8) lexical field: stem cell. (red cells, granulocyte monocytes, platelets, lymphocytes)
stromal cells. (fibroblasts, endothelial cells, macrophages, fat cells).

10 - sentences are long and subordinated.

11 - Translation

تملك الخلايا الجذعية الأولية الحادية للقناع القدرة على التضاعف بنفسها والتكاثر والتمايز إلى خلايا سلفية عالية التخصص والتي تشكل بعد الإنقسام عدة مرات في النخاع خلايا ناضجة (خلايا حمراء، الخلايا الجبيبية الخلايا الحادية، الصفائح الدموية والخلايا التخاعية) للتوابع الدموية وأول ما يتعرف عليه من طلائع خلايا الدم الحمراء هو سليفة الأرومة المتنوية، والخلايا الجبيبية والخلية الحادية هي الأرومة التخاعية. يحدث إنقسام عرضي بين الخلايا السلفية وهو الخلايا التخاعية خلايا الجذع والسلف لا يمكن أن نفرق من حيث الشكل وهي تشبه الخلايا اللمفاوية الخلايا التخاعية يمكن التعرف عليها (بواسطة توابع الدم) في الخبر عن طريق التجارب والتي تشكل فيها مستعمرات - الخلايا السلفية تسبح في الدم المحيط - الخلايا السدوية الموجودة في نخاع العظم (الأرومة البيضاء الخلية البطانية، البلعم، والخلايا الدهنية) تملك خلايا جزيئات مرتبطة وتتفاعل مع الخلايا على الخلايا الجذعية وتحافظ على حياتها.

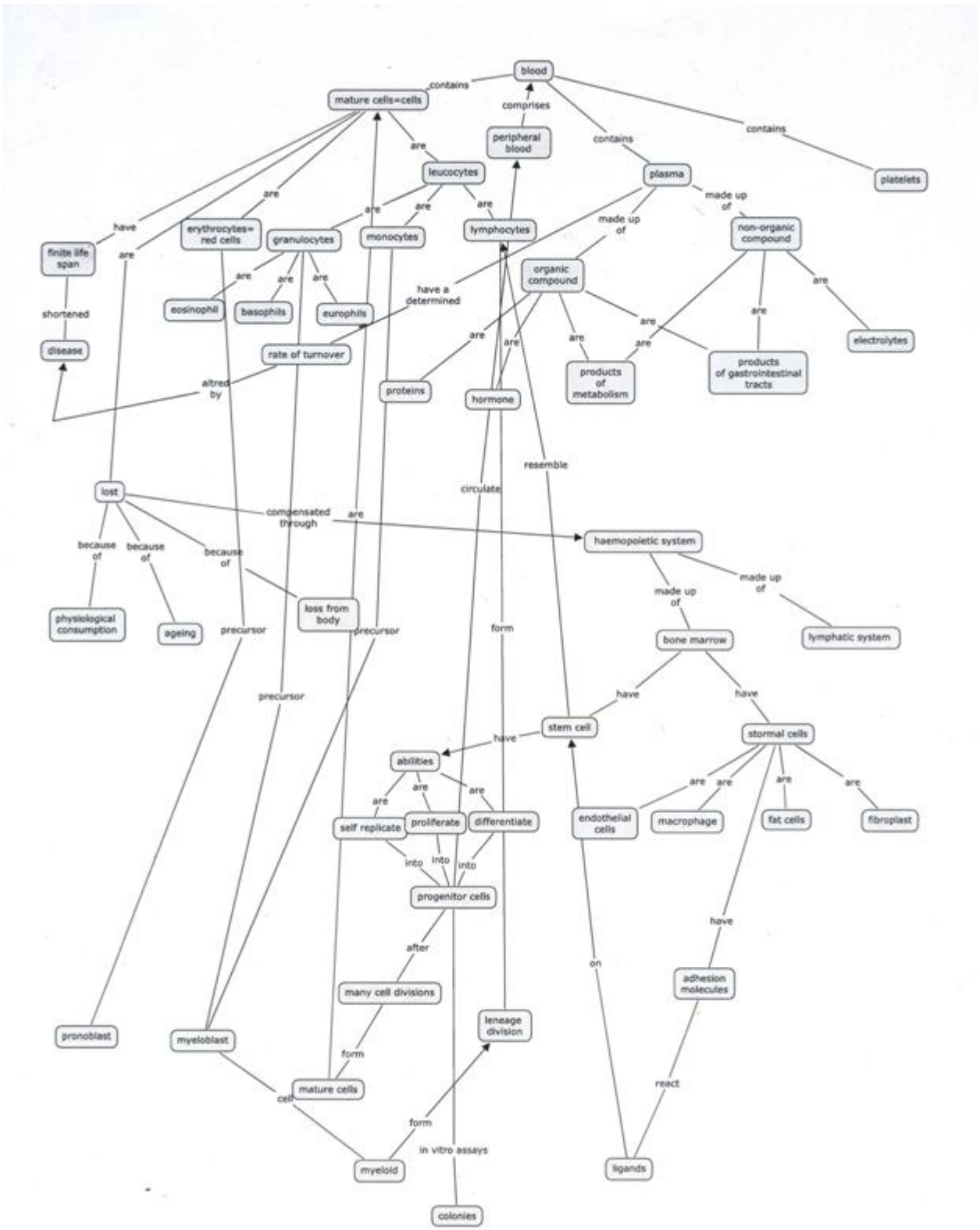
Appendix IX: the analysis of appendix VII

Proposition	The error
P1	Correct
P2	Correct
P3	Correct
P4	Incorrect meaning
P5	Incorrect meaning
P6	Correct meaning
P7	Correct meaning
P8	Correct meaning
P9	Correct meaning
P10	Correct meaning
P11	Correct meaning
P12	Partially correct سطحي
P13	Correct meaning
P14	Correct meaning
P15	Correct meaning
P16	Incorrect meaning انقسام خيطي
P17	Correct meaning
P18	Correct meaning
P19	Correct meaning
P20	Correct meaning
P21	Correct meaning
P22	Partially correct meaning تجمعات
P23	Correct meaning
P24	Partially correct meaning سطحي
P25	Correct meaning
P26	Correct meaning
P27	Correct meaning
P28	Correct meaning
P29	Correct meaning
P30	Incorrect meaning
P31	Correct meaning
P32	Correct meaning
P33	Correct meaning

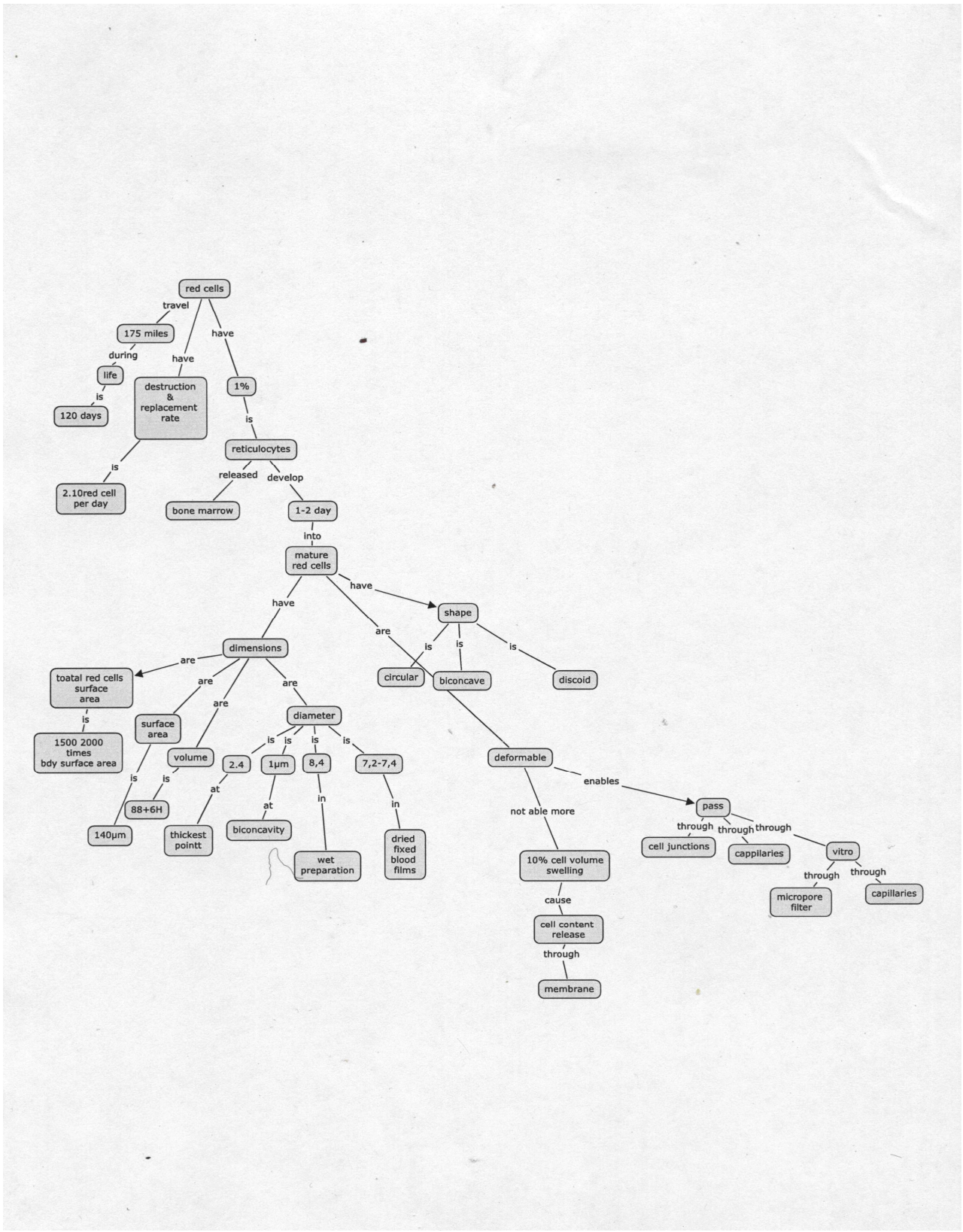
Appendix X: the analysis of appendix VIII

Proposition	The error
P1	Correct
P2	Correct
P3	Correct
P4	Correct
P5	Correct
P6	Correct
P7	Correct
P8	Correct
P9	Correct
P10	Correct
P11	Partially correct meaning خلايا نخاعية
P12	Partially correct meaning توابع دموية
P13	Correct meaning
P14	Incorrect meaning
P15	Incorrect meaning
P16	Partial omission مبكر
P17	Correct meaning
P18	Correct meaning
P19	Correct meaning
P20	Correct meaning
P21	Incorrect meaning الخلايا النخاعية التجارب
P22	Incorrect meaning الخلايا النخاعية
P23	Partial omission الخلايا الجذعية
P24	Correct meaning
P25	Correct meaning
P26	Correct meaning
P27	Correct meaning
P28	Correct meaning
P29	Correct meaning
P30	Partially correct meaning مرتبطة
P31	Partially correct meaning مرتبطة
P32	Correct meaning
P33	Incorrect meaning

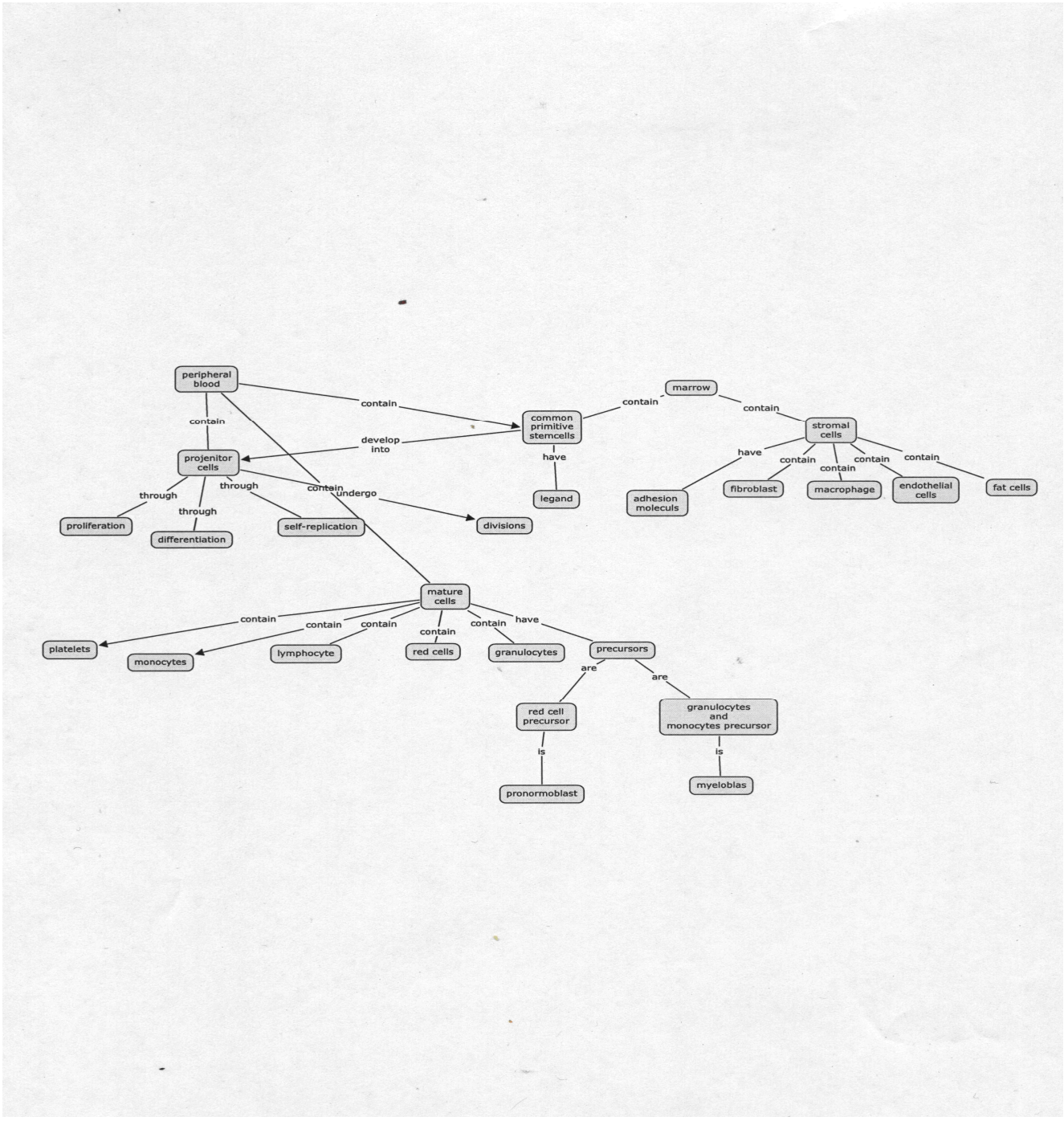
Appendix XI: the concept map of text A



Appendix XII: the concept map of text B



Appendix XIII: the concept map of text C



ملخص

اهتم الباحثون بالترجمة المتخصصة لما لها من أهمية قي نقل العلوم من منظومة لغوية إلى منظومة لغوية أخرى فبذلوا مجهودا لتكوين أشخاص مؤهلين للقيام بهذا النشاط و لعل الموضوع الأكثر تداولا في مجال تعليم الترجمة الكفاءة الترجمية فالترجمة نشاط معقد يتطلب من المرء كفاءات عدة من بينها كفاءة خارج نطاق اللغة موضوع بحثنا.

تحن نفرض أنه من شأن خريطة المفاهيم تحسين كفاءة خارج نطاق اللغة إذ تؤثر على ما وراء العرفان فتمكن المترجم من الوعي بالتنظيم الهرمي للمفاهيم كعامل أساسي لاكتساب المعارف.فإذا ما ضمت هذه الاستراتيجية الماوراء العرفانية إلى المسار الترجمي مكنت المترجم من هيكلة معارفه فتضاهي بذلك تمثيل معارف أهل الاختصاص.

و قد كرسنا دراستنا للترجمة الطبية نظرا لأهميتها كعلم من علوم الحياة و كذا لتهافت السوق على الكتب المترجمة من اللغة الانجليزية أردف إلى ذلك الحاجيات التعليمية لطلبة الطب الذين يعسر عليهم الانتقال من الدراسة باللغة العربية في الثانوية إلى الدراسة باللغة الفرنسية في الجامعة.

لنبلغ مرادنا ارتأينا أن نجري تجربة طلبنا فيها من طلبة السنة الثالثة- ترجمة ترجمة نص باستعمال تقنيتين أولاهما تحليل النص وثانيهما خريطة المفاهيم. فأكدت النتائج صحة فرضيتنا إذ كانت ترجمة الطلبة الذين استعملوا خريطة المفاهيم أجود.

و نحن نقترح استعمال هذه الوسيلة كدعم بيداغوجي لطلبة الترجمة كما نقترح أن يعنى الأساتذة بالاستراتيجيات الماوراء العرفانية,

RESUME

Vu l'importance de la traduction spécialisée dans son rôle de transmetteur du savoir d'une communauté linguistique à une autre, les chercheurs ont investi beaucoup d'efforts pour former des traducteurs spécialiste du domaine. Il est évident que le sujet le plus abordé dans le domaine de l'enseignement de la traduction est celui de la compétence, et comme la traduction est une activité complexe, elle requiert plusieurs sub-compétences entre autre la sub-compétence extralinguistique qui est l'objet de la présente recherche.

Nous postulons que la carte conceptuelle, qui est un outil de représentation des connaissances, pourrait améliorer la sub-compétence extralinguistique .Elle opère sur la métacognition permettant au traducteur d'être conscient du fait que l'organisation hiérarchique des concepts est primordiale pour l'apprentissage de nouvelles connaissances.

Cette stratégie métacognitive, intégrée dans le processus de la traduction, permettra au traducteur de structurer leurs connaissances, donc d'atteindre la représentation des connaissances des experts dans le domaine du texte traduit. Notre étude est consacrée à la traduction médicale vu son importance comme une des sciences de la vie et la demande du marché algérien de livres traduits de l'anglais vers d'autres langues, mais aussi pour les besoins didactiques des étudiants de la médecine

Pour arriver à notre but, nous avons choisi de conduire une expérimentation où nous avons invité des étudiants à traduire des textes en utilisant deux techniques différentes : la carte conceptuelle et l'analyse du texte, attestant que c'est le moyen le plus fiable pour tester cet outil pédagogique. Les résultats ont été probants car les étudiants qui utilisaient la carte des concepts ont produit une traduction meilleure. En conséquence, nous suggérons d'introduire ce supplément pédagogique dans l'enseignement de la traduction, et souhaitons que les enseignants focalisent sur les stratégies métacognitives.