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# Proposal of an alternative method of producing Teixobactin

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**Résumé**

Teixobactin is a natural antibiotic agent and a secondary metabolite synthesized by a Gram negative bacterium called *Eleftheria terrea*. It is a non-cultivable bacterium that has been isolated from the grassy floor in Maine, Boston, USA using a revolutionary instrument called iChip. Teixobactin is a peptide-like antibiotic (11 residue macrocyclic depsipeptide) synthesized by non-ribosomal synthetic peptides *txo1* and *txo2*. This new antibiotic blocks the synthesis of peptidoglycane by fixing on a substrate of the enzymes responsible for the formation of peptidoglycan , It is the intermediary lipidic II or "Lip-II". The conventional antibiotics synthesis method using the source bacterium is considered unnecessary in the case of this antibiotic, because *E. terrae* requires special conditions to grow in a soil medium , so its production until now is based on the creation of the chemical analogs of this antibiotic. A method uses the same amino acids that constitute the original molecule of Teixobactin. This chemical process is very complicated, demanding and expensive. In this perspective we did a search to find an alternative method for the production of this valuable molecule by cloning method. This biosynthetic pathway is simpler, autonomous, less expensive, Fast and more productive. In the Genbank sequence (under the accession code KP006601), the gene of interest starts from the base n° 7977 and ends at the base n° 46377. The enzyme AbaI cuts in three sites: two sites before the gene of interest between the bases n° 7045/7046, 7285/7286 and a site after the gene of interest between the bases n° 46900/46901. We found the perfect restriction enzyme, AbaI endonuclease, resulting from the bacterium "*Azospirillum brasilense* UQ 1796» It is a type II endonuclease, which means that its recognition site is also the cleavage site itself. We found that the perfect vector is the cosmid pHZ1358 (a hybrid vector: lambda-plasmid phage). This is a widely used vector for experiments targeted disturbance and replacement of genes in many *Streptomyces* hosts. We ended with the selection of an appropriate host cell. The cosmids have a "cos" site, a gene from the Lambda bacteriophage which will allow the recombinant vector to be packaged in the head of a lambda virus which specifically infects the bacterial species *Escherichia coli*, which justifies our choice of cell host which is *Escherichia coli*. In this study we propose a new method of producing teixobactin. The cloning method can be a solution for the production of such molecules on an industrial scale and the biological way has shown better potential and high yields for the production of antibiotics in comparison with the chemical one.

**Keywords:** *Eleftheria terrea*, Teixobactin, Production, Cloning method.