Poster

Isolation of microorganisms and bacterial genes with medical interest: resistance to antibiotics for hospital use

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ABSTRACT

Motivation: Due to the intensive use of antibiotics, resistant microorganisms have emerged that limit the usefulness of these compounds. This situation predicts an increase in deaths from infections in coming years. To solve this problem, we are conducting research into the identification of new antibiotic resistance genes, as well as searching for new molecules that could be used as therapeutic agents by themselves or in combination with known antibiotics. For this purpose we are going to study 22 strains resistant to antibiotics for hospital use isolated in the Hospital Virgen Macarena. Furthermore we have developed a genetically modified vector to be able to replicate in Streptomyces (Gram +) and other Gram - to construct metagenomic libraries.

Methods: To identify the genes responsible for antibiotic resistance in the 22 strains from the Hospital, we extracted their DNA using the Kieser method. After that, we analysed the plasmid profile of each strain in agarose gels to search for plasmids that could bear the resistance genes. To determine the presence of these genes in these plasmids, we carried out transformation experiments to transfer the resistance and previously conjugation experiments were done. To date, we have not obtained any transformed strain, that could suggest that the genes that confer resistance are encoded in the chromosome. To solve this, we are constructing a metagenomic library using the DNA of the 22 resistant strains.

Furthermore, we have carried out genetic modification of a vector that is able to replicate in Streptomyces in order to synthesize new antimicrobials. We start from plasmid pMPO571 in which we have inserted a replicase and a new replication origin that is expressed in Streptomyces and also spectinomycin/streptomycin resistance genes since the chloramphenicol resistance marker presented by pMPO571 is not useful for selection in Streptomyces.

Results and conclusions: After completing electroporation transformation experiments, we have not obtained any transformant that resist different concentrations of antibiotics, consequently we are working on the construction of a metagenomic library of the 22 strains and we will search for cosmids carrying the resistance genes .

On the other hand, we have achieved the modification of the vector for Streptomyces. In future experiments we will transfer this new vector by conjungation into E. coli, Streptomyces and other specialized Gram negative strains.

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