**INTRODUCTION**

*Mycobacterium tuberculosis* infection remains a major cause of morbidity and mortality in large parts of the world and is considered to be one of the most important global health problems. Despite the use of vaccine and effective antibiotics, in 2012, an estimated 8.6 million people developed TB and 1.3 million died from the disease (including 320 000 deaths among HIV-positive people). (WHO,2013)

**EFFLUX PUMPS**

In the pathogen *Mycobacterium tuberculosis*, drug resistance is mainly due to chromosomal mutations in genes encoding the drug target or drug activating enzymes. However, drug efflux pumps could contribute to the acquisition of such mutations and explains why mutations in the target genes were not found in many low level resistant strains. Some efflux pumps have been characterized to know whether they are involved in MDR-TB and the role they play. These pumps are Tap and MmpL7 for extrusion of rifampicin and an isoniazid, respectively. [2]

**CONCLUSIONS**

- The analysis of genome sequences have shown that *M. tuberculosis* has many open reading frames of putative efflux pumps. However, the role of these pumps in intrinsic and acquired resistance has not been determined as a major cause of the antibiotic resistance of mycobacteria. They are responsible for low-level resistance.
- One efflux pump is able to confer resistance to two antibiotics for its ability to recognize both as substrates. Furthermore, it presents cross-resistance developing MDR, which alters not only first-line drugs, but also second-line anti-TB drugs. This makes the treatment period longer and more difficult.
- More research is needed, either for efflux pumps, because not all of them have been characterized, or for their inhibitors, because the known ones lead to pharmacological disorders.

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**REFERENCES**


