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## Magnitude of gene mutations conferring drug resistant in *Mycobacterium tuberculosis* strains in southwest Ethiopia

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**Background:** The nature and frequency of mutations in rifampicin (RIF) and isoniazid (INH) resistance *M. tuberculosis* isolates vary considerably according to the geographic locations. However, information regarding specific mutational patterns in Ethiopia remains limited.

**Methods:** Mutations associated with RIF and INH resistance was studied by GenoType MTBDRplus line probe assay in 112 *M. tuberculosis* isolates. Culture (MGIT960) and identification tests were performed at Mycobacteriology Research Center of Jimma University, Ethiopia.

**Results:** Mutations conferring resistance to INH, RIF and MDR were detected in 36.6% (41/112), 30.4% (34/112) and 27.7% (31/112) of *M. tuberculosis* isolates respectively. The retreatment category 'treatment failure' is associated with a high rate of mutations associated with drug resistance (p-value <0.05). Among 34 rifampicin resistant isolates, 82.4% (28/34) had *rpoB* gene mutations at codon 531, 2.9% (1/34) at codon 526 and 5 had mutations only at wild type probes. The later isolates were depicted as unknown. Of 41 INH resistant strains, 87.8% (36/41) had mutations in the *katG* gene at Ser315Thr1 and 9.8% (4/41) of strains had mutation in the *inhA* gene at C15T. One INH resistant strain had mutation only at *KatG* wild type probe. Mutations in *inhA* promoter region were strongly associated with INH monoresistance. Monoresistance to INH (10 isolates) was frequently observed as compared to RIF monoresistance (3 isolates).

**Conclusions:** High rate of drug resistance, including MDR, was commonly observed among failure cases. The most frequent gene mutations associated with the resistance to INH and RIF were observed in the codon 315 of the *katG* gene and codon 531 of the *rpoB* gene, respectively. Further studies on mutations in different geographic regions using DNA sequencing techniques are warranted to improve the kit by including more specific mutation probes in the kit.

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## GeneXpert: A new tool for the rapid detection of Rifampicin resistance in *Mycobacterium tuberculosis*

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This study aimed to evaluate the diagnostic sensitivity and specificity of GeneXpert (MTB/RIF) assay for the detection of Rifampicin (RIF) resistance in *Mycobacterium tuberculosis* (MTB) by comparing the results with conventional drug susceptibility testing (DST) as "Gold Standard". A total of 2200 pulmonary and extra-pulmonary specimens were collected from TB suspects from 2012 to 2014. All specimens were processed for ZN staining, LJ culture according to WHO protocol GeneXpert (MTB/RIF) as per manufacturer instructions. All the cases which are positive for MTB were further processed for DST for RIF. Out of 2200 TB suspects, 840 (49.46%) cases were GeneXpert (MTB/RIF) positive for MTB. Among these 15.6% (134/840) cases showed RIF resistance. The sensitivity, specificity, PPV and NPV of GeneXpert for RIF resistance were found to be 98.3%, 99.1%, 94.7% and 99.4% respectively by comparing the results with DST. Our study revealed that GeneXpert (MTB/RIF) is an extremely helpful diagnostic tool for detection of RIF resistance in TB suspects with fairly high sensitivity and specificity along with 2 hours turnout time, which facilitates proper in time management and treatment among MDR-TB patients in developing countries.

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