

# Drug resistance-associated genes: A cornerstone for the control and protection against tuberculosis

September 5 2013

---

BGI in collaboration with Institute of Biophysics, Chinese Academy of Sciences, and other Chinese institutes, have completed the genome sequencing of 161 *Mycobacterium tuberculosis* that can cause an infectious disease tuberculosis (TB). The study published online in *Nature Genetics* provides an invaluable resource for researchers to better understand the genetic basis underlying drug resistance TB.

TB is one of the deadliest infectious diseases. The World Health Organization estimates that one-third of the world's population is infected with *M. tuberculosis*. Although TB control efforts have made an encouraging 1.3% decline in TB incidence worldwide each year since 2002, drug-resistant TB is still a serious and growing global challenge for treatment. The drug resistance is particularly acute in China, where 5.7% of new TB cases are multidrug-resistant (MDR), and 8% of MDR cases are extensively drug-resistant (XDR).

To understand the drug resistance mechanism from DNA level, Chinese researchers conducted a comprehensive genome-wide study of 161 *M. tuberculosis* strains with a broad range of resistance profiles (44 drug-sensitive, 94 MDR and 23 XDR isolates). In total, they discovered 72 novel genes, 28 intergenic regions (IGRs), 11 nonsynonymous SNPs and 10 IGR SNPs with strong, consistent associations with drug resistance.

Researchers found that the genetic basis of drug resistance is more

complex than previously expected. The identification of new drug resistance-associated genes, IGRs and SNPs provides a nearly complete gene set for studying drug resistance TB. These findings lay a solid foundation for the in-depth investigation of the drug [resistance mechanisms](#) in both *M. tuberculosis* and other bacterial pathogens treated with the same antibiotic regimens.

Dongfang Li, Project manager from BGI, said, "The drug resistance of *M. tuberculosis* is a very serious problem, especially in China. We expect our breakthrough can shed new insights for exploring the mechanisms of [drug resistance](#), and lay a solid foundation for the control and protection against TB."

Provided by BGI Shenzhen

Citation: Drug resistance-associated genes: A cornerstone for the control and protection against tuberculosis (2013, September 5) retrieved 3 May 2024 from <https://medicalxpress.com/news/2013-09-drug-resistance-associated-genes-cornerstone-tuberculosis.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--