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A groundbreaking European research project focused on tuberculosis (TB) diagnosis and treatment has developed potentially life-saving novel drug candidates and new diagnostics for the condition.


[1]

TB is one of the world's most persistent diseases, and even today, despite medical advances, it still claims around 1.45 million lives worldwide each year. A key reason TB is still a menace is inadequate diagnosis and the ability of the TB-pathogen to adapt to antibiotics. Its drug resistance is a public health problem that threatens progress made in TB care and control worldwide.

The project, NOPERSIST, applied advances in molecular biology and the sequencing of TB genomes (the genetic material of an organism) to better understand the disease and other infections such as HIV.

The research team used novel strategies that could lead to efficient and accurate TB diagnosis and treatment of other persistent infections. These results include the world's first blood test for active TB; a rapid, three-hour test for bovine TB; a novel drug cocktail candidate for multi-drug-resistant tuberculosis (MDR-TB); a new drug candidate for TB; and molecular tests for diseases in pigs. NOPERSIST team also successfully developed a novel adjuvant – or vaccine booster - that could be widely used to create all kinds of vaccines, not only for TB.

The project's breakthroughs are even more exceptional given that diagnoses of these infections are extremely difficult and time-consuming, and no efficient, cost effective tests have been available until now.

"NOPERSIST has been unusually innovative which is evident by the fact that five European patents

have been filed out of the project," says NOPERSIST's project coordinator Prof. Mahavir Singh, from Lionex, a biotech company based in Brunswick, Germany.

Prof. Singh explains that much of the success was down to the application of medical advances in molecular biology and the availability of new information generated after sequencing the TB genome.

"Molecular biology and immunology helped significantly in discovering and developing novel biomarkers as a diagnostic test, as well as a novel adjuvant," he says. *"In addition, genome sequencing helped partners focus on veterinary diseases in cattle and swine. Tests based on genome sequencing results will shortly be developed for some veterinary diseases."*

Prof. Singh adds that with a diagnostic market of TB worth nearly €1 billion, NOPERSIST's new leads could bring novel products on the market, delivering a major competitive advantage to European industry. "*The new active TB tests have an excellent chance of becoming the major diagnostic tool for TB,"* he says. Further research planned under the follow-up project, Demo-NOPERSIST, is expected to bring the diagnostic products on the market within the next 2-3 years.

Prof. Singh believes the project team has not merely learnt about the mechanisms of drug resistance in TB and improved current techniques for rapid detection, but it has also stimulated the exploration of new targets for drug activity and drug development. *"NOPERSIST project was a good example of how a motivated research team performing a highly ambitious project with a small budget can really achieve its objectives, and have significant social and economic impact on human health in Europe and elsewhere,"* he concludes.

Nearly nine million people around the world became sick with TB in 2011, according to the US-based Center for Disease Control and Prevention.Drug-resistant TB - which occurs when the bacteria develops the ability to withstand antibiotic attack - is difficult and costly to treat. It can be fatal, and an estimated 650,000 people worldwide have MDR-TB.

See also:
CORDIS [2]
Project:
Novel strategies for the prevention and control of persistent infections
Project Acronym:
NOPERSIST

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[1]
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