Editorial

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Journal of Pharmaceutical Microbiology

2015
Vol. 1 No. 1:3

Tackling Tuberculosis: Natural Sources as an Inspiration for New Drugs

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Received: December 02, 2015, **Accepted:** December 02, 2015, **Published:** December 07, 2015

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Citation: Seidel V. Tackling Tuberculosis: Natural Sources as an Inspiration for New Drugs. J Pharm Microbiol. 2015, 1:1.

Tuberculosis (TB) is the leading bacterial killer worldwide and has been declared a global public health emergency. The World Health Organisation reported that *Mycobacterium tuberculosis*, the causative agent of TB, was responsible for 1.5 million deaths and 9 million new TB cases and in 2013. TB rates are particularly high in developing countries where, with HIV/AIDS and malaria, it creates a huge burden on healthcare systems. The current treatment for TB is a lengthy process which involves complex drug regimens, with adverse effects and interactions, and is associated with poor patient compliance. This has led to the gradual emergence of multidrug-resistant (MDR-TB) and more recently, extensively drug-resistant strains of TB (XDR-TB). The treatment of MDR- TB requires expensive drugs and XDR-TB is often incurable. The rise in resistant TB over the past decade is now a worldwide emergency [1,2].

Although drug discovery efforts have intensified in recent years, with two new anti-TB drugs licensed and a few others currently undergoing clinical evaluations, the current drug development pipeline is still insufficient to address such a global health challenge. There remains an urgent need to discover and develop new drugs which could help treat TB, particularly shorten the duration of treatment, target dormant sub-populations of *M. tuberculosis* and act on drug resistant strains [3]. In addition to that, new antimycobacterial agents are needed to improve the treatment of chronic infections caused by non-tuberculosis mycobacteria which have become difficult to treat [4].

Natural sources represent a unique pool of highly chemically-diverse substances which have evolved to specifically interact with biological targets and often have an ecological role to counter microbes in the environment [5]. Several studies have already highlighted the potential for natural sources to yield new templates for anti-TB drug design [6-10]. However, many natural sources have yet to be thoroughly investigated chemically and biologically and so there remains a great potential to afford new scaffolds for anti-TB drugs. Intensive research efforts to isolate, identify and elucidate the mode of action of new antimycobacterial natural products are required now so as to provide new lead molecules for drugs to tackle the global burden of TB in the future.

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