Tuberculosis and Diabetes Mellitus: pharmacological aspects of convergence of two epidemics

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I. Background

Despite all hard works, Tuberculosis (TB) is still far from conquered. Data from the WHO Global TB Report 2014 tell us that TB is still a major global problem; 9 million cases reported in 2013, mainly resides in Asia and Africa. Although the Millennium Development Goals (MDGs) in halting and reversing TB incidence has been achieved, the target to decrease it by 5-10% per year was only been achieved for about 1.5-2% per year. Mortality has decreased by 45% between the year of 1990–2012, but still 1.5 million of TB patients die yearly. The incidence of TB in 2013 was 126 cases per 100,000 populations per year. It was 56% in South East Asian and Western Pacific regions, 25% in African regions. [WHO GTR 2014)

As for Diabetes Mellitus (DM), almost 400 millions of people are living with diabetes worldwide, and it is predicted that almost half of them (46%) were undiagnosed. More than three-quarter (77%) of them live in the low- & middle-income countries, where TB also resides. Twenty years from now, it is estimated the number will be increased up to 600 millions. [IDF, 2014] It happens due to several changes in the low and middle-income countries, such as globalization, urbanization, socio-economic changes, population growth and migration (from rural to urban). [Anca, LDM, 2014]

While TB incidence is decreased by only 2% per year, the prevalence of DM has increased by around 20% in the past three decades. Fifteen percent of adult TB is attributed to DM, or correspond to one million cases per year. Almost 92% resides in the high-burden countries. [Lonnroth, LDM, 2014]

More and more evidence show that TB spread is fueled by rising of rates of diabetes. Weakening of immune system makes diabetics become more vulnerable to have TB. Two systematic reviews by Jeon et al (PLOsMed, 2008) and Baker et al, (BMC med, 2011) show us that the association between TB and DM is established. DM triples the risk of having active TB (RR: 3.11, 95% CI 2.27-4.26)[Jeon, PLoSmed, 2008], and is associated with poorer treatment outcomes. More treatment failure (RR:1.69, 95%CI 1.36-2.12), and more relapse RR: 3.89, 95%CI 2.43-6.23). [Baker, BMC med, 2011)

There are many other recent reports from many countries. For example the report from Tanzania, 1250 TB patients were recruited and being followed up for