**Synthetic Approaches to the Preparation of Enantiomerically Pure Mycolic Acids**

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Mycolic acids, $\alpha$-alkyl, $\beta$-hydroxy long chain fatty acids are major constituents of the cell envelope of *M. tuberculosis* and other mycobacteria. They are crucial for mycobacterial survival and have been implicated as virulence factors. The synthesis of single enantiomers of these fatty acids will help to improve the understanding of the physical and chemical properties of mycolic acids, which might also lead to a better insight of their biosynthesis, which is already exploited as a prime target for anti-TB drugs. Additionally, synthetic mycolic acids offer interesting possibilities for the development of new methods for the diagnosis and treatment of TB and related diseases. Natural mycolic acids or their derivatives are now being employed in the preparation of ELISA kits and biosensors. These tools have shown very good potential for the serodiagnosis of TB and related illnesses, since antibody activity to mycolic acids may act as surrogate marker for TB infection. We investigate different synthetic approaches to the preparation of all the different types of mycolic acids including a-, keto- and methoxy-mycolic acids. An important key step in their synthesis was the preparation of the corinomycolate part, which is an essential feature common to all mycolic acid types. It constitutes a chemical challenge due to the presence of the two chiral centres, both in the R-configuration. Having prepared the corinomycolate analogue this was used to synthesise the first example of an enantiomerically pure synthetic a-mycolic acid. Simultaneously examples of methoxy and keto meroaldehyde were also prepared. Through these studies it was possible to establish a feasible approach to chemically introduce each of the prominent features, i.e. cis and trans cyclopropanes, methoxy and keto groups, into single synthetic mycolic acid enantiomers. Complete synthetic mycolic acids representing the various types in nature will then be tested as antigens for the serodiagnosis of TB and related diseases at University of Pretoria, in order to better understand the mechanism of their recognition by antibodies and immune cells.