DIAGNOSIS OF ACUTE AND CHRONIC ENTERIC FEVER USING METABOLOMICS

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Elin Näsström was born in Strömsund, Sweden in 1988. She received Bachelor and Master (one year) degrees in Chemistry at Umeå University in 2010 and 2011 before starting as a PhD student in the research group of Prof. Henrik Antti at the Department of Chemistry, Umeå University.

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Enteric fever is a systemic infectious disease mainly caused by the Salmonella bacteria S. Typhi and S. Paratyphi A. The disease is transmitted through contaminated food and water and it is therefore a major problem in many resource-limited areas due to poor water quality and sanitation. There is no animal reservoir for enteric fever and therefore transmission occurs only among humans. The transmission is complicated by the presence of chronic asymptomatic carriers, which forms a reservoir for the infecting bacteria. The human-restricted nature of enteric fever in combination with available vaccines suggest that there should be possibilities for regional elimination of the disease. However, large efforts are needed in many areas to reach such a goal. One area of great importance is the improvement of diagnostic methods since current methods suffer from major limitations. Inaccurate diagnostic methods have consequences for infected individuals, with increased risks of complications due to inaccurate treatment. It is also of importance for estimations of the global disease burden, which can aid in the decision-making regarding vaccination programs and water/sanitation infrastructure investments. In addition, the ability to detect chronic carriers would be relevant as a public health tool.

In this thesis a mass spectrometry-based metabolomics approach, including chemometric bioinformatics techniques for data analysis, has been used to investigate the metabolite patterns in plasma and urine from patients with acute and chronic stages of enteric fever. The aim has been to search for metabolite patterns with the potential for use in the development of new diagnostic tests.