MARIA KLASSON, received a Master of Science Degree at Örebro University in 2014. Maria did her master thesis in the field of occupational hygiene at the Department of Occupational and Environmental Medicine at the University Hospital in Örebro, and she continued working at the same department for her PhD studies. Maria is also a certificated science teacher and has worked both in Sweden and in California, USA.

Occupational exposure to cobalt occur during production of hard metal and the exposure can lead to several negative health effects including contact eczema as cobalt is one of the most potent sensitizing metals. In this thesis, cobalt levels was measured in air, on skin and in blood in individuals working in a Swedish hard metal production industry. Comparisons have been made against national benchmarks and relationships have been investigated to evaluate the importance of skin uptake. One of the aims is to gain increased understanding of the toxicity of cobalt during skin uptake. Therefore, laboratory experiments was established to study dose-response conditions of cultured human skin cells upon cobalt exposure. A special focus is to understand the link between cobalt exposure and inflammation and specially activation of the NLRP3 inflammasome, which controls the inflammatory process and thus may be the underlying cause of the health problems that can arise from cobalt exposure. The data show that the skin absorption of cobalt accounts for a surprisingly large part of the total absorption. In laboratory experiments, the metabolic activity of the skin cells was found to be negatively affected by increasing cobalt exposure time as well as concentration. Inflammatory substances that skin cells secrete in response to various forms of stress were also measured, and the response was associated with increased cobalt dose and exposure time. The inflammatory substances that the skin cells produce are in control of the onset of contact eczema. In addition, increased amounts of proinflammatory substances that are formed when the inflammasome is activated, was found. These findings are of great interest as the skin is often overlooked for uptake, which often leads to unnecessary health problems. The hope is that the data in my thesis may help to establish a minimum level of exposure that can be tolerated without providing adverse health effects, and to increase our knowledge of the underlying mechanisms of this type of inflammation.

ISSN 1652-4063
ISBN 978-91-7529-352-3

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2020

ÖREBRO UNIVERSITY

Doctoral Dissertation

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## – exposure via inhalation and skin and the inflammatory response in human keratinocytes

MARIA KLASSON
*Medical Science with a specialisation in Biomedicine*

Örebro Studies in Medicine 220 | ÖREBRO 2020

ÖREBRO UNIVERSITY

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