

Research into dermatitis and tuberculosis rekindled

14.10.2012



The Institute for Pharmacy at the Martin Luther University of Halle-Wittenberg (MLU) is one of Germany's largest pharmaceutical institutions. Drug research is one of this academic institution's current areas of focus. When commencing research regarding the basics of a substance's method of action, the Halle-Wittenberg University institute is consulted prior to bringing in partners from the industry to do further research - as is the case in the search for anti-inflammatory agents, which can penetrate deep in to the skin's layers, and thus help with neurodermatitis. Another major area of research is that of drugs to fight tuberculosis. Tuberculosis is one of the most widespread diseases in the world, and can spread rapidly thanks to our globalised way of life.

"The skin is a reflection of the soul" - the truth of this phrase is demonstrated in the growing number of skin conditions such as psoriasis and neurodermatitis. They are the most frequently occurring reactions to our environment, to food, and to stress - and have increased significantly over the last 30 years.

"Despite its sensitivity, the skin is our thickest membrane - with the exception of the bladder," says Prof. Reinhard Neubert. He goes on to explain that, for this very reason, the skin is also a 'barrier' against pharmaceutical agents.

The scientist is chairman of the associated Institute for Applied Dermatopharmacy and deputy director of the Institute of Pharmacy at the Martin-Luther University of Halle-Wittenberg. A good combination when it comes to the development of topical applications for the skin, which are meant to be absorbed and to work within the skin's layers, without getting into the bloodstream and causing side effects in the body.

Under the direction of Prof. Neubert, postgraduate and PhD students conduct research into active substances that are able to penetrate through the skin's natural barrier, deep in to the membrane's layers, where they effect their anti-inflammatory action. Such active substances include tacrolimus, which is incorporated in to the oil of a medical vehicle system, and anti-inflammatory peptides, which are incorporated in to the water of such a vehicle.

"60 percent of what we do here at the Institute of Pharmacy," says Prof. Neubert, "is basic research. When it comes to the 40 percent of applied research, the clients are large pharmaceutical companies, but medium-sized cosmetics manufacturers are also important partners. Among these are manufacturers of herbal medicines. In this area especially, researchers have the opportunity to contribute their own ideas to a product's development," explains Prof. Neubert. A number of diploma and doctoral theses are being written about these collaborations.

Prof. Peter Imming's field of research is the synthesis and testing of new drugs to fight tuberculosis. Tuberculosis bacteria are able to modify their metabolisms, making them dormant, allowing them to survive undetected in the bodies of humans and animals for several years. The onset of the disease occurs when the immune system is weakened, explains Imming. This explains why tuberculosis is particularly prevalent in disadvantaged and poor areas, and in war-struck zones. Imming indicates the areas with the highest prevalence of the disease: Commonwealth Independent States (CIS) and African countries south of the Sahel zone. This infectious disease is on the rise worldwide, thanks to our globalised lifestyle. The World Health Organisation (WHO) estimates the number of those infected with tuberculosis at 2 billion - a third of the world's population. The number of deaths caused by tuberculosis is estimated at two million per year, which makes it one of the world's deadliest infectious diseases.

Since strains which are resistant to multiple drugs present a major problem, the skills of the renowned Institute for Pharmacy at the MLU are in demand.

"Because the tuberculosis bacterium has a very thick and heavy permeable cell wall, it is very difficult to treat," says pharmacist and chemist Imming, "treatment lasts between six months and two years and requires a combination of three or four different antibiotics. This often leads to incompatibilities and the development of resistance."

A few months ago, in June 2012, Peter Imming and his co-worker, Ines Rudolph, were able to submit a patent via the MLU as the inventors of 'anti-mycobacterial active substances and methods for their preparation and use.'

"We are researching new classes of active substances, which attack new parts of the pathogen's metabolism, in order to provide a greater selection of medicaments. In this way, resistance and incompatibilities can be better overcome", the scientist explained.

He goes on to say that it is important, in this context, that these drugs are not expensive. "Ultimately, treatment programs must be financially feasible in poorer countries," says the professor.

In addition to an existing collaboration with a foreign pharmaceutical company, he hopes to find potential industry customers, who are interested in the development of highly-effective substances, closer to home.

Capture: Prof. Reinhard Neubert (left) and Prof. Peter Imming in front of an ultramodern device: The mass spectrometer allows the penetration of active ingredients in the skin to be measured.

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14.10.2012

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