

Dermato-Venereological Research at Linköping University

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The Department of Dermatology and Venereology in Linköping is a university department seeking to deliver a holistic platform of medical care, research and teaching. Linköping is one of Sweden's "young" universities. The medical faculty was established in 1970. A further major step was the establishment of the Faculty of Health Sciences with both pre-clinical and clinical training of medical students. The new problem-based curriculum, which has achieved high national and international assessment rankings, celebrated its 25th anniversary in 2010.

Although the Department of Dermatology was established in Linköping in 1951, the town's history shows us that the original hospital (Stadslazarettet, established in the 1700s) was used primarily to take care of patients with syphilis. Although syphilis lost its epidemic status in Sweden around 1950, recent changes in the demography and behaviour of our society have reminded us of the need for continued vigilance and research in this ancient disease; both smaller epidemics and sporadic cases of syphilis have been observed and reported from the county of Östergötland. Chlamydia remains the most commonly diagnosed sexually transmitted disease (STD) and we carry out research based on the diagnostic certainty of our clinical culture routines for this disease. Studies emanating from the STD clinic in Norrköping are conducted in routines for the diagnosis of *Mycoplasma genitalium*.



Fig. 1. Cecilia Bivic working with cell cultures.

We continually document antibiotic resistance and investigate the speed and certainty of recovery after commencement of antibiotic treatment.

Dermatological research in Linköping is broad, with a focus on the barrier function of the skin, inflammatory diseases, such as eczema and psoriasis, and skin pigmentation and photobiology.

The barrier function of the skin

The many and complex functions of the skin include that of being a barrier against an often-threatening environment. Homeostasis demands normal function and there are many examples of diseases with pathogenetic bases in abnormal function. The consequences of barrier failure often include inflammation. Linköping University was founded on, and has continued to have, a strong base in technology. The Department of Biomedical Engineering grew out of that base and is an important local collaborator with our department. A number of techniques for visualization and quantification of tissue reactivity, such as evaporimetry, laser Doppler flowmetry and imaging, and, more recently, polarization spectroscopy ("tissue viability imaging"), have been developed and were first used in Linköping. Barrier function and other components of innate response in the skin continues to be an area of research interest. Linköping also has pioneer status in clinical microdialysis technique, used in the study of skin barrier function, and in studies of skin metabolism and inflammation.

Inflammatory diseases

Eczema and psoriasis are dermatology's major inflammatory conditions (though there are literally hundreds of less common diseases). An area of interdisciplinary focus is atopic eczema. Linköping's Allergy Centre has provided a platform for interaction with allergologists and paediatricians in this complex disease with basic science interaction with a range of scientists in Clinical and Experimental Medicine. Psoriasis has been the subject of increased focus, with a range of research activities from quality assurance in healthcare



Prof Chris Anderson, Head of the Department of Dermato-Venereology



Charlotta Enerbäck, Associate Professor in Dermatology.

delivery and patient information, observational and clinical studies including use of skin microdialysis, histological studies and basic research studies of inflammation and genetics. A specific research programme has been made possible by a generous donation from the Ingrid Asp Foundation. The programme's ultimate goal is to obtain improved understanding of the pathogenesis of psoriasis and to find new modalities for its therapy. Research is devoted to three major areas. Firstly, using cell biological techniques, the pathogenesis of the disease is studied, with special interest in angiogenesis. Second, circulating cytokines and their relationship to the co-morbidities of psoriasis, such as coronary heart disease, are studied. Finally, we study the genetic aspects of psoriasis with the aim of defining the hereditary contribution to disease risk and severity.

Skin pigmentation and photobiology

The marked increase in the incidence of malignant melanoma has been an important impetus for research in both the clinical patterns of presentation, the relationship to the common occurrence of pigment naevi and the actual biology of the skin's reactivity for, and adaptation to, ultraviolet (UV) radiation. Bioengineering methods have been used to quantify innate skin reactivity to UVB and the photodynamic reaction to aminolaevulinic acid. Behavioural aspects of

sunlight exposure have also been studied. Our department's focus on cell biology has been a basis for detailed studies of melanocyte tissue homeostasis. We address functions and signal transduction of the transcription factor p53 and heat shock proteins in the regulation of UV-induced apoptosis of melanocytes and the role of these proteins in progression to naevi and melanoma. More recently, interest has focused on the inflammasome and the effect of pro-inflammatory paracrine inhibitors of melanocyte proliferation and melanogenesis to explore why individuals with atopic eczema have fewer naevi. Studies identifying prognostic markers for melanoma development and progression in apoptosis regulated/associated genes are on-going and a large registry study is evaluating the influence of pregnancy on prognosis in women with melanoma.

Concluding remarks

The department also has a broad range of smaller areas of interest. We are optimistic about our future contributions to dermato-venereological research in our current fields of interest. We anticipate opportunities for the broader application of the lessons we have learnt in these areas to the many (literally hundreds) of diseases within our specialty. We intend to continue to develop our local, national and international collaborative programmes.

Linköping University Hospital

White arrow indicates the position of Department of Dermato-Venereology.

Photo: Göran Billesson.



Facts

Within the medical faculty, Dermato-venereology is a department in the division of Clinical and Experimental Medicine. In the county organization we are in the Division of Medicine and Cardiology. The specialties with which we have most interaction, Rheumatology, Infectious Diseases, Allergology, Gastro-enterology and Environmental Medicine are within the same division. The clinical department runs clinics for diagnosis and treatment in both Linköping and Norrköping. The strategy of the Health Faculty is to spread both research and undergraduate teaching through the county of Östergötland and to collaborate with the neighbouring counties of Jönköping and Kalmar.

The group of researchers at the Department of Dermatology and Venereology in Linköping consists of:

- 2 Professors
- 2 Assistant Professor
- 4 post-doctoral scientists
- 3 PhD students

The group publishes approximately 10–20 original articles per year. Ten theses have been published within the research groups during the past 5 years.