Dermato-Venereological Research in Iceland

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Landspitali University Hospital

The Icelandic Medical School was founded in 1876, 35 years prior to the foundation of the University of Iceland in 1911. Landspitali University Hospital was founded in 1930. The first professors at Landspitali University Hospital were in Internal Medicine and Surgery, but the first specialist employed in 1930 was a dermato-venereologist. The Department of Dermatology and Venereology of the University of Iceland is within the Faculty of Internal Medicine. The department has never had a full professorship, as this position requires full employment in both the University and the hospital, which has not been practical for the speciality.

Most of the chairmen of the Department of Dermatology and Venereology of the university have also held the chief position in the hospital department. However, this was not the case in the early days of the department, and is also not the present situation, as *Dr Jon Hjaltalin Olafsson* left the position of chairman of the hospital department a few months ago, but is still chairman of the university department. The current chairman of the hospital department is *Dr Baldur Tumi Baldursson*.

There is only one 37% "Docent" position in the university; an "Associate Professor" position, which is directly below the full professorship. The position below this would be a "Lector" or "Assistant Professor". There are, however, two Adjunct Professors, who do not receive a salary, but who have teaching duties. These are 3-year positions, currently held by *Dr Bardur Sigurgeirsson* and *Dr Steingrimur Davidsson*.

During the last 10 years 33 papers have been published by the teachers and co-workers of the Department of Dermatology and Venereology of the University of Iceland. These publications comprise more than 80% of all publications in this field in the country. The main research projects have been performed in cooperation with the following organizations:

A) Decode Genetics in Iceland,
B) The Blue Lagoon,
C) Agency for Research on Cancer, Lyon, France,
D) The Icelandic Cancer society,
E) Department of Immunology University of Iceland,
F) The Icelandic Radiation Safety Authority,
G) University departments in Copenhagen, and
H) The pharmaceutical industry.

The focus has been on melanoma genetics and epidemiology, melanoma in airline crews, ultraviolet (UV) radiation, psoriasis (see the presentations from Dr Eysteinsdottir and Dr Thorleifsdottir, and fungal infections. Collaboration with Decode Genetics over the last 10 years has resulted in 8 publications in prestigious journals, albeit with numerous authors. All research in Iceland is performed on a voluntary basis and teaching positions in the University are only for teaching. Other dermatologists in the country are employed in private practice and some perform their own research (as described below), which is truly admirable.

A Study on the Effect of Blue Lagoon Therapy on Psoriasis

The Blue Lagoon is a geothermal lagoon in Iceland. It contains a mixture of seawater and freshwater and has an extremely high level of silica. It is moderate in temperature (37°C) and salinity (2.7%). The microbial ecosystem of the Blue Lagoon is unique, with Silicibacter lacuscaerulensis and Cyanobacteria as the dominant species. Recent data indicate that both the silica mud and 2 microalgae species growing in the Blue Lagoon promote the integrity of the skin barrier and delay extrinsic skin ageing, thus indicating biological activity in the lagoon. Psoriasis affects both the physical and the emotional well-being of patients, and its effect on quality of life is similar to that of other major medical diseases (e.g. diabetes, arthritis, heart disease and hypertension). It has been reported that bathing in the Blue Lagoon for 3–4 weeks has beneficial effects on psoriasis. Three studies have shown that additional treatment with narrow-band UVB radiation (NB-UVB) therapy further increases the efficacy of the treatment. For the last

4 years we have conducted a randomized trial comparing psoriasis treatment in the Blue Lagoon with conventional NB-UVB phototherapy. This research is part of the PhD study of *Jenna Huld Eysteinsdottir*, currently a 4th-year resident at the Department of Dermatology, Sahlgrenska Hospital, Göteborg, Sweden. The studies were performed in co-operation with The Blue Lagoon Ltd, Professor Björn Runar Ludviksson at the Department of Immunology, Landspitali University Hospital, and Dr Jon Hjaltalin Olafsson and Dr Bardur Sigurgeirsson. The studies were co-led by the latter two dermatologists. Treatment in the Blue Lagoon has been found to have a substantial effect on clinical and histopathological outcomes, as well as immunological modulatory effects in the blood. Significant reductions in Psoriasis Area and Severity Index (PASI) scores, compared with NB-UVB therapy, were observed as early as week 1 in the groups treated in the Blue Lagoon. In addition, a significantly higher percentage of patients in the treatment groups showed a reduction in PASI score of at least 75% or a Lattice score of clear or almost clear as early as 2 weeks after the start of treatment. Approximately 70% of patients in the treatment groups experienced a reduction in PASI score of more than 75% after only 6 weeks of treatment. Furthermore, 42% of patients who received in-patient treatment in the Blue Lagoon achieved a reduction in PASI score of more than 90%. This beneficial clinical effect is associated with histological improvement in the skin and improvement in quality of life (DLQI), as well as a reduction in the IL23/Th17 inflammatory cell axis, which may be important in the pathogenesis of psoriasis. The results await publication.

Effect of Tonsillectomy on Chronic Plaque Psoriasis Patients with a History of Exacerbation after Tonsillitis

Psoriasis, which is a T-cell mediated inflammatory skin disease, can be triggered and aggravated by streptococcal throat infections. We hypothesize that the tonsils may be important breeding stations for cross-reactive T cells, which recognize streptococcal antigens (M-proteins) in the tonsils and keratins presented by HLA class I molecules in the epidermis, thus playing an important pathogenic role in psoriasis. We have reported a marked increase in such cross-reactive, mostly CLA+CD8+, T cells in the blood of psoriasis patients. Over the last 4 years we have conducted, for the first time, a blinded, prospective study to assess the clinical and psychosocial impact of tonsillectomy on chronic plaque psoriasis. We have also assessed, using a detailed questionnaire, the percentage of psoriasis patients in Iceland who have tonsillitis-associated aggravation of psoriasis. This research is the PhD study of *Ragna Thorleifsdottir,* currently a 4th-year resident at the Department of Dermatology, Uppsala University Hospital, Uppsala, Sweden. Initial results have been published and further results await publication. The studies were performed in co-operation with Professor Emeritus Helgi Valdimarsson at the Department of Immunology, Landspitali University Hospital, and co-led by 2 dermatologists, Jon Hjaltalin Olafsson and Bardur Sigurgeirsson. In summary, the group found sustained clinical improvement after tonsillectomy, ranging from 30% to 90% reduction in PASI score, coinciding with a marked decrease in the frequency of cross-reactive skin-homing T cells in the blood. In addition, a strong correlation was observed between the degree of reduction in frequency of these cells in individual patients and the extent of patient improvement. Quality of life improved significantly after tonsillectomy and correlated with the improvement in the PASI scores. Preliminary results indicate that approximately 40% of patients with chronic plaque psoriasis in Iceland report exacerbation in association with tonsillitis. These findings suggest that effector T cells in psoriasis may, to some extent, be generated in the tonsils. The results may help to identify the autoepitope(s) in psoriasis.

Private practices with research

Bolli Bjarnason, Utlitslaekning ehf, Alftamyri 1-5, 108 Reykjavik, Iceland

Dr Bolli Bjarnason's principal ongoing research projects are as follows:

In vitro testing for contact allergy. This project has focused on the mediator response of cultured keratinocytes to different contact allergens. One of Dr Bjarnason's students, Margrét Sigurðardóttir, recently published the thesis "Detection of contact allergy" based on this research (Faculty of Medicine, University of Iceland). This project involves collaboration with US investigators.

In vivo optimization of patch-test techniques. This project is based on the application of opaque test materials to investigate minimum test volumes for different patch sizes. The technique is based on the laser Doppler perfusion imaging technique.

Choice of test allergens. Iceland is considered by some as both a European and a US consumer area. Some of the standard tray allergens used in the US are not commonly used for testing in Europe. This study investigates whether there is a reason to include some US standard tray allergens when testing in Iceland.

Drug response in inflammatory skin disease. This project uses the laser Doppler perfusion imaging technique to assess the effect of different drugs on inflammatory skin diseases.

Ellen Mooney, Laekning, Lágmúla 5, 108 Reykjavik, Iceland

Virtual Dermatopathology:
In collaboration with an international team of dermato-pathologists, *Dr Ellen Mooney* has been conducting research on comparative diagnostic accuracy in virtual (digital) dermatopathology since 2008. The results have been presented at the annual meetings of the International Society of Dermatopathology and the American Society of Dermatopathology, and published in the American Journal of Dermatopathology, Journal of Cutaneous Pathology, and Skin Research and Technology. In addition Dr Mooney has participated in research into trends in Breslow's tumour thickness of cutaneous melanoma in Iceland during the period 1980–2009, the results of which were presented last year as a poster at the European Academy of Dermatology and Venereology (EADV) meeting in Lisbon, Portugal.

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