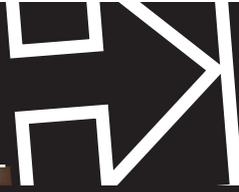


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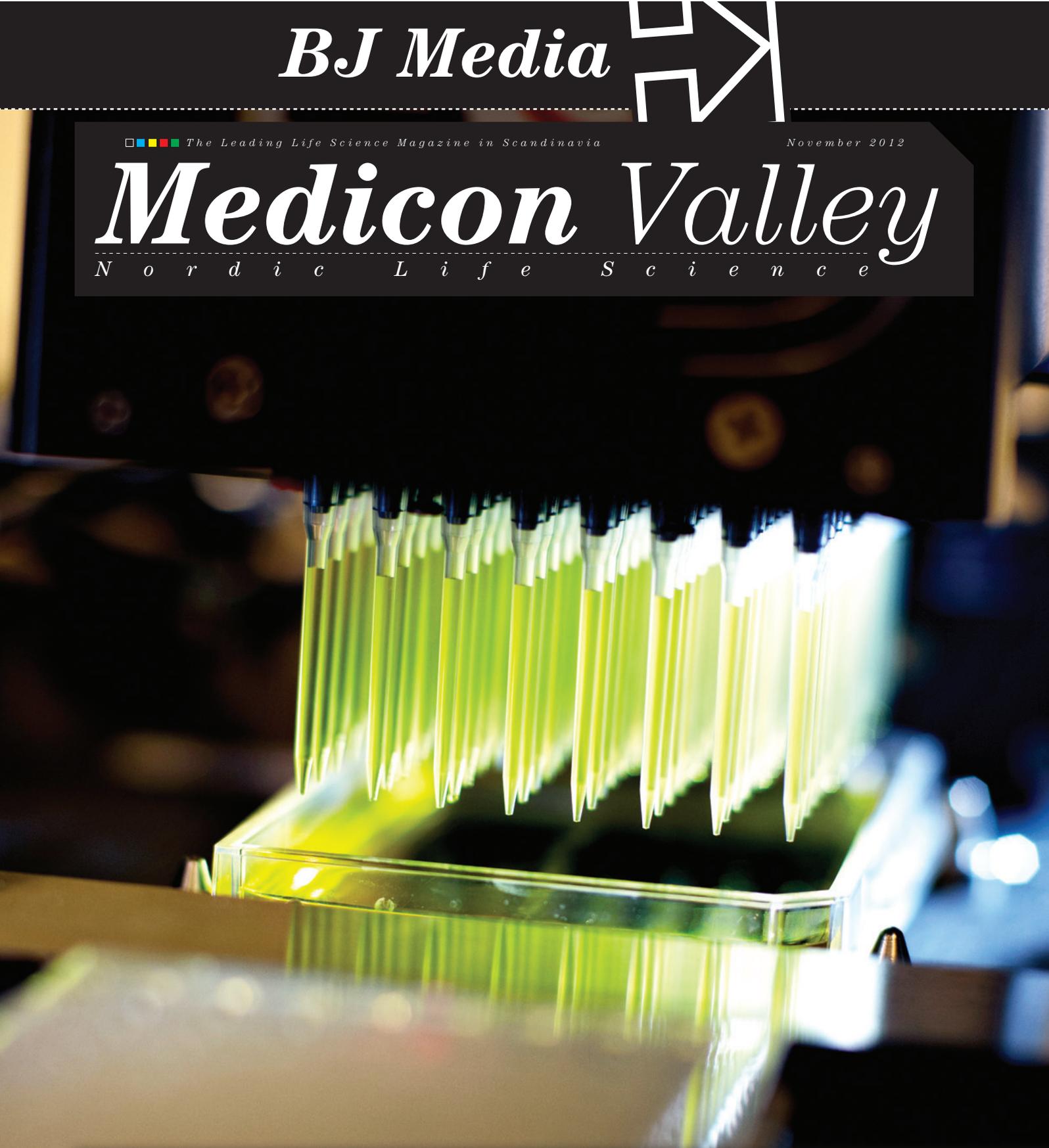


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November 2012

Medicon Valley

N o r d i c L i f e S c i e n c e



*Innovative
Medicine 2012*

Copenhagen hosts international symposium on Autoimmune Diseases

By Chris Tachibana

Autoimmune diseases such as multiple sclerosis and rheumatoid arthritis tend to be higher in certain geographic regions - including Scandinavia. So Nordic researchers and physicians had a special interest in hearing international experts talk about the latest discoveries in autoimmunity

On 27 September 2012, leaders in autoimmune disease research gathered at the Carlsberg Academy at the historic Carlsberg Brewery in Copenhagen, Denmark. In a building where the Nobel prize-winning physicist Niels Bohr and his family once lived, scientists shared their insights into new and promising treatments. The symposium was organized by Bioneer and Biopeople.

Bioneer, based in Hørsholm, Denmark, is a biotechnology services company that operates on a nonprofit basis as an Advanced Technology (GTS) company under the Danish Ministry of Science, Innovation and Higher Education. The company's services include discovery, development and evaluation of immune modulating compounds making the symposium a natural fit for Bioneer's interests. CEO Poul Andersson noted that the invited speakers were "on the forefront" of their field, and that this area is a high priority area for Bioneer.

Biopeople is a network connecting academia and industry, funded in part by the Danish Agency for Technology and Innovation, under the Ministry of Science, Innovation and Higher Education. The goal of Biopeople is developing research into innovations.

A recurring theme: T regulatory cells

Kicking off the symposium was a plenary lecture from Jane Buckner, associate director of the Benaroya Institute in Seattle, Washington, USA, a research institute for autoimmune diseases. She offered a general model for autoimmunity in which a person is born with a certain genetic risk for autoimmunity. Environmental factors then influence whether the person enters a preclinical phase that might be detectable by the presence of specific physiological markers, and might further transition to clinical disease. Buckner said that although all autoimmune diseases—including systemic lupus erythematosus, multiple sclerosis, inflammatory bowel disease, and rheumatoid arthritis—are characterized by inherited genetic risk and production of self-targeting autoantibodies, each autoimmune disease is clearly unique. Therapies for one do not necessarily work for another. Research and clinical attention is currently

focused on how defects in T regulatory cells (T regs) lead to autoimmunity, and how learning about this disease mechanism might lead to new treatment. Presentations on using T regs therapeutically came from Petra Hoffman, University Medical Center, Regensburg, Germany, who presented work using T regs to combat graft-versus-host disease, and Arnaud Foussat, Tx Cell, France, who spoke about trials using T regs against Crohn's disease. Buckner showed a model that was an underlying theme for many of the symposium presentations, in which T effector cells promote autoimmunity, but are hindered by T regs. Therefore, deficiencies in T reg cells or their activity can lead to autoimmune disease. However, some researchers expressed concern about the current intensive focus on T regs. - We are in a phase of T reg investigation right now. We'll see where it leads, said one.

Still much to learn

Buckner's research is on type I diabetes, a condition usually associated with metabolism, but which has the characteristics of autoimmunity including disruption of T effector-T reg interaction, at least in mouse models of type I diabetes. However, Buckner's research group found that in humans, the defects are not solely T reg malfunction, but a combination of decreased T reg function and nonresponse of T effector cells. The findings are common with other autoimmune disorders and suggest potential treatment of type I diabetes with cytokines, which are immune system signalling molecules, such as interleukin 2 (IL-2). Buckner concluded with a common, cautionary theme in the talks and discussions over coffee and lunch: the complexity and interactivity of immune system components makes the treatment of autoimmune disease extremely complex. Even if a therapy works, we don't know the exact mechanism. Results that indicate a mechanism in mice might not reflect what is happening in the human immune system. And finally, targeting one element of the immune system often induces an unexpected response in another. For example, any therapy that suppresses part of the immune response to dampen autoimmunity might affect the ability to fight infections. This means for effective therapy. - We need to investigate doses, timing, better T reg modulation, said Jane Buckner.

Exploring the complexity of the immune system

Common lessons from the presentations were the importance of local physiological influen-



Jane Buckner, associate director of the Benaroya Institute in Seattle, Washington, USA

ces on the development of autoimmunity, such as the influence of the central nervous system in multiple sclerosis. Variations in local milieu could account for some of the differences among autoimmune diseases, and variation among individuals with the same disease.

Other symposium speakers were Vivianne Malmström from Karolinska Institute, Sweden; Michael Ehrenstein, University College London, UK; Jens Gerwien, Novo Nordisk, Denmark; Marco Prinz, University Medical College, Freiburg, Germany; Burkhard Becher, University of Zurich, Switzerland; Shohreh Issazadeh-Navikas, University of Copenhagen; Finn Sellebjerg, Copenhagen University Hospital; and Simon Jensen, Bioneer. Speaking about her specialty, rheumatoid arthritis, Malmström voiced a concern of many of the clinicians and scientists at the symposium who are seeking more long-term, potentially curative therapies:

- We are modulating T reg function in part by registered immunomodulating therapies, but we are not curing RA.

Nonetheless, conversations during coffee breaks among clinical researchers and physicians with autoimmune conditions were hopeful. One physician noted how transformative biologic therapies have been for treating diseases such as rheumatoid arthritis. Recent successful biologics for autoimmune diseases include monoclonal antibodies against cytokines, and CTLA4-Ig, an antibody-cell protein fusion that inhibits T effector cells. Although they are not cures, new biologics can be effective, at least temporarily, against autoimmune disorders. In the meantime, the researchers at the conference continue exploring the complexity of the immune system for new T cell biomarkers, critical immune cell interactions, and insights in cell signalling that could lead to better diagnosis and treatment of autoimmune diseases.