Karolinska Institutet / AstraZeneca
Integrated Cardio Metabolic Centre

Unique industry/academia collaboration spurs creativity and scientific innovation

“Our collaboration with AstraZeneca on the ICMC is truly special – a much deeper collaboration than the usual relationship between industry and academia. Here, industrial scientists and academic scientists are working side by side in a dedicated university unit. We are realising more and more that we need each other. Universities have been successful over time in explorative research but will not be able to develop new drugs without the support of, and interaction with, industry. With this collaboration, we share a common goal – to develop new therapies for patients in need.”

Professor Hans-Gustaf Ljunggren
Dean of Research
Karolinska Institutet
AstraZeneca has collaborated with Karolinska Institutet in Sweden, one of the world’s leading medical research universities, for many years on different projects. Building on our shared history, we created a joint centre for research on cardiovascular and metabolic diseases, where academic and industrial scientists work side by side to advance innovative science.

Karolinska Institutet / AstraZeneca Integrated Cardio Metabolic Centre (KI/AZ ICMC) was established on Karolinska Institutet’s campus in Stockholm. The centre’s recruitment drive aimed to secure the right mix of scientific skills to benefit both organisations and stimulate scientifically groundbreaking research that could lead to new drug development and new therapies for patients.

The ICMC aims to identify and validate novel targets within cardio-metabolic diseases, focusing on three strategic research areas: heart failure, diabetes and chronic kidney disease across both small molecules and biologics.

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**Making scientific progress in heart disease**

One of our ongoing collaborations at ICMC is with Professor Kenneth Chien, a world renowned leader in cardiovascular science and medicine and Principal Investigator at the Integrated Cardio Metabolic Centre.

Our work with Ken and his team centres around developing novel therapeutics for heart muscle disease, with specific focus on heart failure and regenerative cardiology. The main approach is a new technology – chemically modified RNA (Ribonucleic Acid). To date, Ken’s team has developed a method to stimulate the generation of heart tissue following myocardial infarction by using mRNA (messenger RNA) injected into the muscle encoding a single growth factor (protein) to create new vascular cells rather than scar tissue that doesn’t help the heart to pump.

**Ken tells us how we will move the science forward through the collaboration:**

“Through the ICMC collaboration, we have been able to move this early work forward; getting modified RNA (modRNA) expressed at levels which generate heart response in large animals and exploring new ways to use modified RNA in patients with heart failure. In addition, we are also exploring ways of expressing RNA as an inhibitor in heart muscle to block pathways that inhibit the heart function. This is very exciting.

The advantage of mRNA rather than gene therapy is that it’s dosable and it’s not forever. By contrast, with gene therapy you can’t turn it off.

We are on track to be able to express any protein at will – and to express it specifically into the heart of just about any animal with a single injection. We can generate mRNA faster than we can protein, so this gives us a speed and agility of treatment that we wouldn’t otherwise have. We’re now looking at ways to use modified RNA to tackle epicardial fat – the fat around the heart – which is a known risk factor. We’re using the heart as its own test tube.

**Teamwork is needed for the challenging future ahead**

Easy work for drug development is over. From now on, it’s going to be hard and you need the best people and the best science; working with people who are not risk averse. It’s not good enough to develop a “me too” product. We have to be innovative and brave in our thinking.

The work we did before the collaboration had only been able to reach a certain point because we might come up with a novel approach, but we were blocked from moving into drug development because we didn’t have the muscle or technical know-how. The translational pathway for any science in academia should be with a trusted, respected, thoughtful, rigorous partner in the biotech or large pharma sector. A partner who is willing to do challenging early-stage work.

We now have a unique collaboration with AstraZeneca in Mölndal and a joint project team moving this forward into clinical testing. This is a novel biological agent, not a small molecule, so we need the full resources necessary to test toxicity, safety and efficacy. AstraZeneca’s support is absolutely essential. They have the research capabilities and toxicology expertise needed, and they’ve also made pivotal contributions to allow the application of this technology in the clinic. In addition, their knowledge of regulatory pathways in general, and in Sweden in particular, is invaluable.”

*A commissioned review on a new approach to manipulating the gene program of the adult heart via the generation of chemically modified mRNA (Chien KR, Zangi L, Lui KO) was published in Cold Spring Harbor Perspectives in Medicine in October 2014.*
Collaboration in practice

A joint steering committee with shared research objectives oversees nine research groups under the leadership of a joint director. AstraZeneca scientists are fully integrated with academic scientists, combining our resources and drug discovery experience with our partner's research capabilities.

The ICMC is designed to conduct preclinical and clinical studies to advance understanding of cardiovascular and metabolic disease pathophysiology, assessing new drug targets for our Innovative Medicines and Early Development as well as MedImmune biotech units.

Success criteria also include jointly-authored original and review articles plus conference presentations.

What’s special about the collaboration?

Karolinska Institutet perspective:

“"As a university, we want to develop a vibrant scientific community where important discoveries are made. Discoveries that may eventually lead to new drugs for patients. We also expect significant output in terms of scientific papers and new intellectual property. Together, we can do things we wouldn’t be able to do on our own. For many industrial scientists, it's exciting to work closely with academia – and vice versa. We each have our own assets to share, and aim to get the best of both worlds. Our recruitment drive has been extremely successful, with prominent applicants from around the world, and we have high expectations for the years ahead."

Professor Hans-Gustaf Ljunggren, Dean of Research, Karolinska Institutet

“AstraZeneca perspective:

“This collaboration helps us to address fundamental biological questions around the disease areas we are interested in. It contributes to us gaining a better understanding of these diseases, which in turn opens up new possibilities for innovative drug development for cardiovascular patients. The work supports our scientific leadership strategy and gives an extra dimension to our CVMD therapeutic focus. It's work we wouldn't be able to do by ourselves, but combined with Karolinska Institutet we have a unique arrangement where we complement each other's expertise. This is a new, deeper level of collaboration between industry and academia. Working together on site at Karolinska Institutet provides a seamless scientific interaction. We’re influencing the direction of research but we’re not so prescriptive that we're telling them what to do. This creates an open forum for scientific collaboration; a chance for us to recruit new talent, and an opportunity for both parties to interact more freely on many levels, to broaden the scientific expertise addressing AstraZeneca projects and Karolinska Institutet's research."

Marcus Schindler, VP, Cardiovascular & Metabolic Diseases iMed, AstraZeneca

Anders Hamsten, Vice Chancellor of Karolinska Institutet