ICI BULLETIN | OCTOBER 2015 | ISSUE 1

ICI institute for chemical immunology

Interview

CHEMICAL SOLUTIONS FOR BIOLOGICAL PROBLEMS

HERMEN OVERKLEEFT, PhD
Professor of Bio-organic Synthesis at the Leiden Institute of Chemistry

A new institute, new research challenges, new partnerships and new discoveries lying ahead: it all calls for a newsletter. The ICI Bulletin will be published twice a year and will focus on the people behind the science. Each issue will feature a number of regular items, including an interview with two PhD students on their joint project, a column by a scientist who may or may be not affiliated to ICI, a portrait of a partner organisation and an opening interview with a leading researcher from the chemical immunology field. In this first issue of the ICI Bulletin, Hermen Overkleeft, professor of Bio-organic Synthesis at Leiden University and principal investigator within ICI, kicks off.

Hermen Overkleeft is one the initiators and driving forces behind ICI. He goes more deeply into proteasome inhibitors, creating crossovers and the joy of designing a molecule.

Your research field is bio-organic synthesis. What made you take the leap to immunology?

"To me, it is not a leap. I am interested in finding chemical solutions to biological problems, which also includes questions related to the immune system. In my lab, we have been working on the chemistry of the immune system for a long time. When the Gravitation Programme was announced, I wanted to submit a proposal related to chemical biology. Sjaak Neefjes (who I already knew) was thinking about submitting an immunology proposal, and combining the two seemed a logical step; immunology covers almost all aspects of molecular and cell biology and the chemistry involved is very broad. Moreover, we have a number of internationally renowned immunology research groups in the Netherlands. Together, Sjaak and I started building a consortium, which developed into the Institute for Chemical Immunology." ▶

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The core team consists of six scientists. Who does what?

"Carl Figdor and Ton Schumacher are the 'real' immunologists, but both also have a strong link to chemistry in their research. Piet Gros is the expert on structural chemistry, Albert Heck takes care of the analytical chemistry part, I am the organic chemist in the team and Sjaak actually knows his way around all these fields. Although we all have different backgrounds, we share an interest in translating immunological phenomena into chemical structures and vice versa."

Looking at these immunological phenomena as an organic chemist, what will be your research focus within the ICI?

"One of the topics we are working on concerns proteasome inhibitors. There are two types of proteasomes, which both degrade proteins into smaller peptides. The constitutive proteasome acts primarily as a garbage disposal unit. The immunoproteasome plays a role in class I antigen presentation; it degrades proteins present on viruses and presents the peptides to the major histocompatibility complex (MHC). The combined proteasome has six different binding activities and my goal is to create highly specific chemical knock-outs for each separate activity. By silencing one activity, we can get a detailed view of what happens to the peptides that normally would be presented as epitopes by this

"The chemical approach is sometimes much more simple than nature's solution"

particular part of the proteasome. Where do these peptides go now? Such studies are very relevant to increase our understanding of auto-immune diseases. We will also use this approach to learn more about the role of post-translational modification (PTM) in peptides. Does that influence the actions of the proteasome? Are PTMs linked to auto-immune diseases? We have almost completed our toolbox of proteasome inhibitors. These will be used by Albert Heck's group to perform mass spectrometry experiments using their collection of MHC class I epitopes. Hopefully this will reveal exactly which oligopeptides end up on the antigen-presenting cells."

What led you to this topic? What bigger questions do you want to answer?

"I don't have big, abstract questions and to be honest, I don't believe such questions make any sense. That is far too much of a reductionist approach to science."

"I don't believe in big, abstract questions"

Fair enough, but then why did you decide to work on chemical biology? Being an organic chemist by training, you could have chosen a variety of chemical specialisations.

"This may sound like an easy answer, but I got into it by chance. You can find beauty in nature on many levels and during my studies, my supervisor taught me to see the beauty of nature on the molecular level. I was intrigued by how you can use chemistry to impact biological processes and by the fact that sometimes the chemical approach turns out to be much simpler than nature's solution. Examining a process from a chemical perspective can really teach you a lot about what is actually happening. Besides that, I still very much enjoy designing and creating a molecule with a specific functionality. That is in essence what we do: designing molecules that can perform certain tasks."

The ICI covers such a broad range of scientific disciplines, how do you find enough common ground?

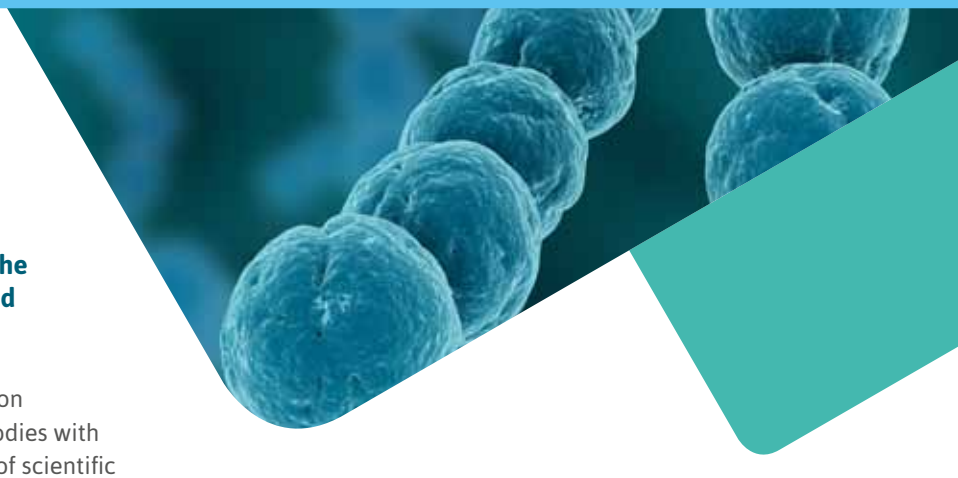
"Organising the PhD projects as joint operations in which a student with a chemistry background collaborates with another who's worked on immunology is a deliberate choice to stimulate cohesion and interaction. We also organise meetings along different research lines, for example bringing together everyone who works on bioconjugates or all researchers working on rheumatoid arthritis. This leads to crossovers, as all the participants fit into at least two subgroups. This way we create many opportunities for scientists to meet each other in different settings and with different areas in common. That will surely help to get a dynamic and tight-knit community off the ground." ■

Institute for Chemical Immunology

The Institute for Chemical Immunology (ICI) is a collaboration between a number of internationally-renowned Dutch research groups specialising in immunology, chemical biology, structural biology, proteomics (protein research) and drug development. The ICI works on a unique research programme combining chemistry and immunology to diagnose and treat diseases related to immune system failure via new, targeted chemical compounds. Besides research, education is a core activity of the ICI. PhD students and postdocs working on ICI projects are given interdisciplinary training to provide them with a greater range of approaches connecting chemistry and immunology.

www.chemicalimmunology.nl

COMBINED FORCES: CREATING NEXT GENERATION ANTIBODY-DRUG CONJUGATES



AIMM Therapeutics (AIMM) has a long history of working with the research community and commercial partners. "Collaboration brings out the best from the individual participants," says Hergen Spits. AIMM's core business links up perfectly with the ICI's Grand Challenge around 'chemistry-based immunotherapeutics'.

AIMM is a leading antibody company that focuses on developing high-affinity human monoclonal antibodies with high therapeutic value. The company evolved out of scientific research at Amsterdam's Academic Medical Centre, forming in 2004 to develop a progressive approach to the discovery of therapeutic antibodies. Hergen Spits, Professor of Cell Biology at the AMC, is one of the cofounders and has served as the Chief Scientific Officer since the company's inception.

Spits describes AIMM's origins: "In our research we had discovered a promising method of genetic modification, which we applied to generate cell lines of antibody-producing B cells *in vitro*. Unfortunately, this was not successful. Although the cells reproduced as planned, they also differentiated to plasmablasts that did not divide and subsequently died off. To acquire B cells that continue to proliferate *in vitro*, while maintaining the capacity to produce antibodies, the terminal differentiation needed to be blocked. Ultimately, through working with colleagues from the Netherlands Cancer Institute (NKI) we succeeded in perpetuating the immune system's memory B cells by introducing two cellular factors, BCL6 and Bcl-xL, which transforms the B cells into long-living self-renewing plasmablasts."

AIMM was created as a spin-out of the AMC and NKI to commercialise this newly discovered technology for immortalising human B cells. In 2009, AIMM acquired a seed capital investment from Life Science Fund Amsterdam. Further development of the technology has resulted in sophisticated platforms coupling proprietary knowledge of B cell immortalisation with the isolation of promising antibodies from humans or animals. The antibody technology platform was patented and since then AIMM has developed a promising pipeline of novel antibodies to prevent or treat diseases with high unmet medical need. AIMM's current focus is on cancer. Earlier programs that targeted infectious diseases have produced antibodies that are currently in clinical Phase 1 and Phase 2 as well as late-stage preclinical development. For instance, the immortalised B cell approach has led to a specific antibody for the prevention of respiratory syncytial virus (RSV) infections in young children at risk such as premature babies.

Challenged by the ICI project

The new ICI's Grand Challenge project particularly focuses on antibody-drug conjugates, or ADCs, with a cytotoxic compound coupled to a tumour-binding antibody. The antibody guides the ADC to the targeted tumour where it releases the payload to destroy it. This approach may result in a new highly potent biopharmaceutical class of anticancer therapeutics. "Using the specific and selective targeting mechanism of the antibody, the ADC can discriminate with great sensitivity between normal and cancerous tissues, allowing a significant reduction in the therapeutic dose of the drug and thus reducing toxic side effects in patients. For AIMM the ICI project implies great challenges," Spits explains. "We will contribute our antibody technology platforms and our knowledge of immunology to discover new and unique tumour-specific antibodies suited for ADC applicability and to develop novel site-specific linking technology to couple the antibody to the cytotoxic drug." Alongside AIMM, other specialists will be needed in areas such as tumour biology, chemical synthesis and click chemistry. "We will join forces to realise the potential of antibody-drug conjugates for the treatment of cancer." ■

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Zooming in on the surface

PhD project: Dissection of the cancer MHC ligandome

To advance the interaction between chemistry and immunology beyond the purely theoretical, the ICI has organised its PhD projects into joint ventures: in each project two PhD students, one with a background in chemistry and another in immunology, team up to tackle a problem together. How does this function day-to-day, and what does this set-up offer the individual researchers? In each issue of the ICI Bulletin, we will talk to a research duo about their project. We kick off with Kaspar Bresser and Anita Jeko, who are working on the cancer MHC ligandome.

T cell based therapy, in which the body's own immune system is deployed to combat tumour cells, is extremely in demand in current cancer research. "The therapeutic potential of T cells is an important research topic within our group," says Kaspar Bresser, a PhD student in Ton Schumacher's group at the Netherlands Cancer Institute in Amsterdam. One of the ways to apply the concept is through T cell receptor (TCR) therapy, in which the patient receives additional TCRs to improve the immune system's capacity for recognising tumour cells. Bresser: "TCR therapy requires that we know which MHC-bound peptides are presented on the surface of a tumour cell, because these peptides can be recognised by the T cells that we want to engage in immunotherapy. Ideally, these peptides are different from those on healthy cells." This strategy leads to one of the most fundamental questions in cancer research: how can we distinguish a tumour cell from a healthy cell? "The differences are relatively small and that makes the treatment of tumour cells incredibly difficult. It is very hard to attack only tumour cells and leave healthy cells unaffected. So we want to gain more insight into those differences in order to improve cancer treatment."

Kaspar Bresser, MSc
Netherlands Cancer Institute, Amsterdam
Cancer Immunology

Predictive power

Bresser explains how their current method for identifying the T cell epitopes, or MHC ligands, works. "We sequence the DNA from a tumour sample, mostly obtained after surgery, and map the mutations. Using a predictive algorithm we can subsequently predict which epitopes will be presented on the surface of the tumour cells." To elicit an adequate immune response, it is crucial that the right TCRs are available to recognise the epitopes presented by the MHC. This prediction gives an approximation of which peptide may be loaded onto and presented by the MHC and thus generate a T cell-mediated response. In turn, such a prediction assists in pinpointing possible targets for immune therapy. "But it still remains a prediction and we would really like to improve the predictive power of our approach," says Bresser. That requires us to know which peptides are present on the tumour cell surface, so that we can try to connect mutations in the DNA to those peptides and feed that information into the algorithm. Analysing peptides and their post-translational modifications on a cell surface is a completely different ballgame. The only way to do this is by mass spectrometry (MS) and that is where Anita Jeko, PhD student in Albert Heck's group at Utrecht University, comes in.

> *"To me, MS is still a mystery"*

"Using MS, we can identify antigens as they are, including any post-translational modifications," Jeko says. "MS is very suitable for protein sequencing and peptide analysis. We can identify ten of thousands of peptides in a single dataset. It is very sensitive, accurate, fast and reliable. For this type of analysis, MS is the only capable technique." She feels that MS analysis of the tumour samples that Bresser supplies will definitely help to improve the power of the current in silico predictions. "These predictions are based on a limited dataset, which hampers performance. But perhaps even more important is that the method misses out on post-translational modifications of the antigens, and those can certainly play a role in the antigen-presenting process. With MS, we can also

pick up the modifications. Combined with the very accurate analysis of the antigens presented, I think we can really bring the dataset for the predictions to the next level." It sounds as if the MS side of the project is a routine job, but that is very far from the truth, Jeko emphasises. This project involves very advanced and very innovative MS protocols and techniques that justify a full PhD project. "Studying MHC peptides really is an analytical challenge. In a 'normal' MS protein sequencing experiment, we employ well-defined enzymes to artificially cleave the proteins, so we know exactly what type of residue they generate. But in real-life samples, like a tumour biopsy, the proteins have already been cleaved by the cellular machinery. This makes our analysis more challenging for two reasons. First, natural antigens are usually shorter than the peptides we create ourselves in regular samples, making them harder to pick up. Secondly, because the cell creates these peptides, we cannot rely on them to be optimal for MS analysis in the same way that we can with those created by our regular well-defined, neatly operating enzymes. Working with endogenously cleaved peptides makes the fragmentation, ionization and detection processes, as well as the data interpretation, much more difficult."

Complementary skills

Back to Bresser, because it sounds quite complicated and inefficient to work with predictions when you can actually analyse which antigens are present. Why not take the direct route and 'just' run a tumour sample through the mass spectrometer? "The reason is very practical: the sample volumes we can get from a tumour biopsy are too small for MS, whereas sequencing requires a lot less material. We can work with this limited sample size." But Bresser tells us there is more to it than pragmatism: "There are two objectives for this project. One goal is to improve our predictions for clinical use. The other is a research goal; we want to learn more about the peptides that are present on the tumour cell surface, so we can map the MHC ligandome."

Keeping in mind the inherent unpredictability of scientific experiments, how do you operate in the setting of a 'joint PhD project'? "We discuss our progress and our plans and also which experiments should be performed and who is going to do what," says Bresser. "It is still all very new and we have only just started, but we have met a couple of times and we have regular contact through mail and Skype." Bresser and Jeko have very different skills and work on different tasks, but with each other's input, they can each achieve more. Bresser: "My role is to culture the tumour cells that Anita uses in her MS experiments, we discuss the results together and then I feed the data into the algorithm and add it to our database. I really enjoy working with someone who has a completely different area of expertise. To me, MS is still a mystery and luckily, Anita can explain it all to me." For Jeko, the feeling is mutual. "I like this set-up, it is dynamic and it works well. I don't know a lot about cancer biology, but Kaspar can fill me in. Together, we have a good combination of knowledge, skills and experience with different techniques."

"Studying MHC peptides is an analytical challenge"

Anita Jeko, MSc
Utrecht University
Biomolecular Mass Spectrometry and Proteomics

ICI research projects

- Exploring crosstalk between CLRs and TLRs using single molecule vaccines
- Mechanisms of action of the Ubiquitin-like modifier ISG15 in immune regulation
- Dissection of the cancer MHC ligandome
- Development of next generation antibody-drug conjugates
- Understanding and modulating anthracyclin-induced immunogenic death
- Polymer based synthetic dendritic cells
- Organizing molecular complexes of CD37 and CD9 in immune cells
- Turning tumor glycans into anticancer vaccines
- Novel optogenetics approachto study the effects of hypoxic ROS on pDC function in Systemic sclerosis etiology
- Multipurpose Pluribodies
- Exploiting T cell metabolism as a target for therapeutic intervention
- Visualization of vitamin A metabolism
- Specialized pro-resolving lipid mediators: sources and targets in acute and chronic inflammation
- In vivo tracking of T cell epitopes from synthetic tumor vaccines
- Visualizing macromolecular complexes in MHC antigen presentation
- Trojan horses for antigen-specific B cell targeting in RA

Still so much to discover

The ICI and Dutch Arthritis Foundation join forces

Rheumatic disorders and cancer are two sides of the same coin, says Ingrid Lether. The key issue to solve is the regulation of the immune system - "If we manage to tackle that, then we can finally start treating the disease instead of the symptoms."

In June of this year, the Institute of Chemical Immunology (ICI) and the Dutch Arthritis Foundation announced the start of a new partnership. The Dutch Arthritis Foundation wants to help patients suffering from rheumatic disorders, which are, alongside cancer, the focus of the ICI research program. Since the ICI concentrates on both fundamental and translational research, collaborating with the organisation that brings together patients, rheumatologists and researchers working on rheumatism seems only logical.

Crossing borders

In practice however, collaboration and interaction do not just happen automatically, says Ingrid Lether, Manager Research and Innovation at the Dutch Arthritis Foundation. "Even within the Netherlands, we see that rheumatologists are not always aware of each other's research. Therefore we decided a few years back to actively initiate, facilitate and support collaborations with and between research groups, within the Netherlands and abroad. We also aim to further our work with other charitable funds that concentrate on auto-immune diseases." In 2013, the Dutch Arthritis Foundation and Arthritis Research UK jointly funded two research projects in which Dutch and British researchers collaborated. "This was quite revolutionary, because most charitable funds are hesitant to spend their 'national' donations on research that is performed in another country. But our priority is to find a solution for people suffering from arthritis and if that solution can be developed across a border, we are more than happy to contribute."

Encouraged by the success of the UK collaboration, Lether started looking around for more opportunities to join forces and bring people together. "For a while, I had been pondering ways to introduce new perspectives into the arthritis research community, to stimulate people to look and think outside conventional immunological approaches. Around the same time, the ICI was founded and René Toes, who is a member of our Scientific Advisory Board, suggested we get together with them." Things moved quickly from there, as both sides share a no-nonsense attitude and could see the added value of working together. Lether says, "The nice thing about the Dutch Arthritis Foundation is that we have enough means to make a difference, but we are still small enough to be agile and decisive. There is no red tape here, if your plan and your argument is sound, you can go ahead and make it happen."

"There is no red tape here"

Right environment

One of the goals of the collaboration is to create more awareness among rheumatologists and other scientists working in the field of arthritis about the potential for applying chemical tools and approaches in their research. By organising joint calls for proposals, the partners hope to stimulate the arthritis research community to use the tools that are available within the ICI and to develop new ideas together. "The variety of topics and activities that are covered by the ICI combined with their strong focus on delivering

solutions for patients fits really well with our objectives. Next to these joint calls, I think we can really push the field forward by bringing communities together. Not only the ICI and the Dutch Arthritis Foundation, but also researchers and funds that concentrate on other auto-immune diseases." It all starts with getting to know each other and exchanging scientific ideas, she says. "When we had our first meeting with Arthritis Research UK, I was amazed how little the various scientists at the table knew about each other's research. Even though they all visit the same conferences and publish in the same journals, interaction doesn't come automatically; you have to create the right environment."

Lether is convinced that collaborating with the ICI will result in promising new projects and insights. "The topics that the ICI addresses are much broader than just arthritis. Their focus on cancer is highly relevant to auto-immune diseases as well. In the end, the key issue is the regulation of the immune system. If we manage to tackle that, then we can finally start treating the disease instead of the symptoms as we do now.
I am optimistic about our prospects. There is so much we can discover just by learning more about each other's work and by exploring new research fields. Together, we can create a setting where one plus one makes three." ■

"We can create a setting where one plus one makes three"

Reumafonds
Dutch Arthritis Foundation

Benefits from the chemical toolbox

René Toes, professor of Experimental Rheumatology and head of the Laboratory of Rheumatology, Leiden University Medical Center

"Now that a chemical toolbox is available for research into rheumatoid arthritis, a whole world of possibilities opens up. Let me give two examples from our own lab."

Following protein degradation

"The first concerns protein degradation in the cell. This is a completely normal process, but in rheumatoid arthritis (RA) patients, certain post-translational modifications on the proteins are incorrectly recognised as antigens by the patient's immune system, causing an unwanted immune response. We had been puzzled by this for a long time, but we lacked the tools to study the degradation process in sufficient detail. Lucky for us, Sander van Kasteren's group here in Leiden have developed a chemical tool that allows us to follow a protein throughout its degradation by the cellular machinery. Now we can finally find out whether there is a difference in the way proteins are degraded between RA patients and healthy people."

Visualising B-cells

"Another project where chemistry is helping us out concerns B-cells. These are the immune cells that produce the antibodies that very specifically bind to all kinds of threats. One of the characteristics of RA is that the body starts producing antibodies against regular proteins that are no threat at all, leading to a damaging inflammatory response. So far, we don't know which, nor how many B-cells are responsible for producing these unwanted antibodies, where they are located in the body or what they look like. But now we can make progress in answering these question using specific nanostructures that are being developed by Kim Bonger's group in Nijmegen. With these structures we can visualise the auto-reactive B-cells, which hopefully will reveal why these cells start producing antibodies against the body's own proteins. This is another example of how the combination of chemistry and immunology offers promising perspectives for studying RA and why the collaboration between the ICI and the Dutch Arthritis Foundation really makes sense."

Exploring new possibilities

"I know that rheumatologists and researchers in the RA field are very open to exploring new possibilities. After all, rheumatologists were among the first to embrace the use of biologicals in the clinic. Their willingness to subscribe anti-tumour necrosis factor treatment for RA patients, which proved very successful, really helped to pave the way for this new type of drug. I am sure that the possibilities offered by chemical tools and methods will find their way into arthritis research, and collaborating with the Dutch Arthritis Foundation is a sensible step to introduce a large community to this new approach." ■

Let's get new ideas off the ground

ICI Annual Conference 2016

Following the successful kick-off event in March 2015, ICI will host a yearly conference that offers all participants the chance to learn something new. "Sharing your work with others and getting feedback from completely different angles is a great way to come up with new ideas," says Sjaak Neefjes, ICI's scientific director. Where most scientific meetings adopt a specific theme or focus on their programme, ICI wants to celebrate the broad spectrum of research areas that are relevant to chemical immunology. Neefjes: "The strength of ICI is the wide range of scientific disciplines, methods and techniques. From synthetic chemistry to cell biology and from analytical chemistry to clinical expertise. And all these fields are closely linked: we have chemists who develop tools that are used by immunologists to tackle biological problems, which in turn generates new questions for the chemists to work on. By bringing all these researchers together, new ideas start flowing."

Multidisciplinary design

The set-up of the Annual Conference 2016 will be in line with that of the kick-off. An internal pre-conference meant for the ICI researchers and students, followed next day by the main conference intended for a wide audience. Neefjes explains: "We aim for a very broad and diverse attendance. Next to scientists, we also will invite clinicians, charity funds and other stakeholders. We really want to create a sense of urgency on the need for translational research."

Student poll

A special feature of the conference is closely the involvement of PhD students in the selection of speakers and topics. One of those students is Eveline Li (VUmc). "Every two months, we meet up with a small group of ICI PhD students from all over the Netherlands to discuss our ideas on education and training with Martje Ebberink and Reinout Raijmakers," explains Li. "In addition, we were asked to contribute to the PhD day this fall and the ICI Annual Conference next year. We prepared a short-list of speakers, which we shared with all ICI students through a poll on our Facebook page." She is very happy with the ICI's attitude towards the students. "There a lot of attention focused on training us to become excellent scientists in chemical immunology. I really like the way we as PhD students are being involved in matters that can concern our future. It is important and also fun to contribute our insights." ■

Register now!

1 APRIL 2016 - RODE HOED, AMSTERDAM

For more info about the programme and to register, please visit our website www.chemicalimmunology.nl


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Honing soft skills in hard science

The Institute of Chemical Immunology, working with Louise Mennen, has just launched a PhD programme specialising in soft skills to complement scientific study. We spoke to one of its first students.

Embarking on a PhD is a major milestone in any academic career and inevitably a daunting one as well. Taking on a huge scientific goal is exciting, but comes with plenty of unpredictable challenges. It is clear that furthering our understanding of cancer development or immune response is not an easy task, but not all of the struggles of a PhD are scientific. How can you get the most out of your busy supervisor? How do you plan four years in advance? Where do you want your career to go next?

Working with leadership and communication coach Louise Mennen, the ICI has developed a course covering topics ranging from personal effectiveness to career development. The programme is structured across four years, with modules to give guidance throughout a student's PhD and make sure they're equipped with the right skills at the right time. We spoke to one of the first students to undertake the programme, Jorieke Weiden, to find out how it's going so far.

ICI Modules

Module 1
Personal Effectiveness: time and project management
Autumn 2015

Module 2
Communication in Science
Successful networking, presenting convincingly, poster design, communication styles
Spring 2016

Module 3
Personal Leadership
Personal qualities & success stories
Spring 2017

Module 4
A PhD, what next?
Desires and qualities, create your future (vision, action plan)
Spring 2018

Time management

Jorieke's PhD topic concerns the use of three-dimensional scaffolds to create synthetic immune niches mimicking natural lymph nodes as sites of immune cell interaction and activation, with the aim of using these to activate tumour-specific T cells via chemical cues. Jorieke chose Louise Mennen's course because she was keen to augment her scientific knowledge and abilities with other transferable skills that would help her complete her PhD and go on to be helpful throughout her career. She tells us that she is keen to improve herself in areas like "how to manage time and your entire 4-year project, how to manage your supervisor and how to communicate your work to the scientific community".

Completing a PhD isn't supposed to be easy - you don't earn the title of 'doctor' simply by arriving at the lab on time! We spoke to Jorieke about the obstacles she's facing. "The most difficult challenge is how to manage and oversee the huge project that you are handed when you start your PhD, and to do so in an effective way. I think that we've all experienced the feeling of doing a lot of work without generating much useful data, so it can be challenging to stay motivated".

Jorieke has just taken the first module of the programme, covering time and project management, on which she had hoped to learn how to "work more efficiently and tackle ineffective behaviour" as well as how to "prioritise tasks in the right way and improve my planning skills". After the first few days, she was happy to report things were going well. She tells us, "the course was focused on finding out what would work for you as an individual, which I very much liked. There was a lot of attention given to the personal struggles in your project." In Jorieke's case, she sometimes finds it hard to prioritise less urgent tasks, such as her lab journal and reading, so it was helpful to explore strategies such as time blocking and taking a break from emails.

Keen on next sessions

The next module will be on Communication in Science, covering topics like presentations and successful networking. But Jorieke is keenest on the sessions on Personal Leadership, which will deal with approaches to difficult situations, self-assessment and ethics within science. Jorieke is eager to learn more, as she says, "I think this will give a clear insight into my own strength and weaknesses", and specifically, "help me to exploit specific skills that I have and help me become aware of the things that I need to work on in order to successfully finish my project".

There's bound to be great challenges to overcome as Jorieke continues her PhD, but the skills and techniques which she'll hone through Mennen's course should help her to navigate them efficiently. ■

News

Sjaak Neefjes appointed as Van Loghem Laureate 2015

NKI researcher and ICI scientific director Sjaak Neefjes will give the Van Loghem Lecture 2015 at the annual meeting of the Dutch Society for Immunology on Wednesday December 16th, 2015. With this, Neefjes joins the rank of renowned Dutch immunologists who previously received this honor.

Hermen Overkleeft receives RSC Jeremy Knowles Award 2015

Hermen Overkleeft (Leiden Institute of Chemistry, University Leiden) has been awarded the Jeremy Knowles Award 2015 for his innovative and insightful development of activity-based protein probes for the imaging and identification of enzymes in health and disease. The award of the Royal Society of Chemistry is to recognise and promote the importance of inter- and multidisciplinary research between chemistry and the life sciences.

ACS award for Albert Heck

The American Chemical Society has awarded UU researcher and ICI executive board member Albert Heck the ACS Frank H. Field and Joe L. Franklin Ward for Outstanding Achievements in Mass Spectrometry. Heck receives the award for his outstanding work in the field of protein mass spectrometry and role in the development of enabling technologies for both proteomics and structural biology.

Recent publications

C.R. Berkers, A. de Jong, K.G. Schuurman, C. Linneman, H.D. Meiring, L. Janssen, J.J. Neefjes, T.N. Schumacher, B. Rodenko, H. Ovaa.

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Salmonella Manipulation of Host Signaling Pathways Provokes Cellular Transformation Associated with Gallbladder Carcinoma.

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Column

FOUNDATION FOR A STRONG, MULTICULTURAL MARRIAGE

Molecular biology has gained insight into our immune system and its surprising working mechanisms. By recognising what is dangerous and foreign, it protects us against external pathogens and internal threats such as impaired body cells. This may be easy with eyes but, certainly, is more complicated with molecules. And..., unfortunately, it can go wrong resulting autoimmune disorders or a failure to detect tumours or infections. Manipulating the immune system is then important. Tackling the malfunctions needs small (compounds) or large (antibodies, cytokines) tools. Realising such tools definitely involves a field far away from immunology: chemistry.

After centuries of alchemy, we are now becoming aware of the power of chemistry for understanding and manipulating the molecular cell machineries in our immune system. This awareness has been the driving force behind our initiative to establish the Institute of Chemical Immunology (ICI). We are convinced that combining chemistry with immunology will benefit both disciplines. However, it needs the integration of different cultures with different languages and habits. The ICI may be an illustration of a successful multicultural integration and an example for many similar situations in society. History shows that multicultural integration always coincided with the highlight of society and I hope that the ICI will be another highlight.

I am absolutely convinced of the huge opportunities we will create through the chemical immunology approach. The immunologists within ICI have great model systems that can be fuelled by lead compounds developed by the participating chemists and visualised and measured by the other experts within ICI. The new multicultural field of Chemical Immunology has the potential to provide new and original solutions for autoimmune diseases, infectious diseases and cancer.

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ICI is up and running now. Research projects have been launched and multidisciplinary collaborations have been set up. ICI has laid the foundation for a strong marriage between immunology and chemistry. By focusing on a multidisciplinary approach, largely separate worlds are brought together. This is important to bridge the gap between the disciplines and ensure that researchers in the different field understand and appreciate each other. They are the first generation chemical immunologists and – I expect – the parents of many new generations when the potential of this new field is realised. But, above all, it is fun to realise and integrate the activities from other fields in your own experiments! ■

About ICI

The Institute for Chemical Immunlogy (ICI) is an NWO Gravitation project that will define and exploit a new field termed chemical immunology and train a novel generation of interdisciplinary scientists. It aims to promote academic excellence. The ICI publishes twice-yearly the 'ICI bulletin' featuring ICI research, education and other relevant developments. To (un)subscribe please send an e-mail to info@chemicalimmunology.nl

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