

# Pears

In association with



Building

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Building starts to appear

Patients help in hunt for better treatments

Sharing ideas to further research

The building will start to take shape over the coming weeks as the structure rises out of the ground

The construction project is bang on schedule at the start of the new year and with the foundations complete, attention can turn to the building itself.



# Building update and IIT news



## New look for new year

More recognisable structures will emerge on the construction site as the new year advances, with the creation of the basement floor slab, external retaining walls, liner walls and stair cores planned over the next few weeks.

Dust issues have been resolved now that the site is concreted and there are far fewer lorries coming to and from the site.

A series of graphic panels has been installed on the hoarding around the site which explain the research that will go on in the building. The panels include interpretations of the science by local schoolchildren and a display of the work of local artist Oliver Chan. They have been well received by passers-by and staff.

Discussions with Camden Council concerning traffic management issues, particularly at the main entrance, continue and local councillors are getting involved to try to find solutions.

## Fitting pieces into the autoimmune puzzle

Dr Anne Pesenacker's mission is to puzzle out the mechanisms which cause some people's bodies to attack themselves and the particular autoimmune disorder she is interested in is juvenile idiopathic arthritis.

Having arrived from BC Children's Hospital Research Institute in Vancouver last summer, Dr Pesenacker is looking in particular at regulatory T-cells – how they function and are regulated by other cells around them.

"I'm looking at a particular family of what we call co-receptors on T-cells. These co-receptors either diminish or enhance the activation of the cell, depending on how they interpret what is going on in the environment around the cell. But we are not sure how they do this.

"We think that in patients with autoimmune disease, the expression and main function of these receptors is out of balance. If we can find out how they usually work, we can then look at how they're not working properly in autoimmune disease.

"We can then potentially target these pathways to make these regulatory cells work better and actually make the immune system regulate itself."



Dr Anne Pesenacker

She's looking forward to the move to the Pears Building. "We already have a collaborative environment but there will be new people who will bring further expertise. There will also be different equipment which I can use to ask specific questions about immunoregulation in new ways, so that we can really understand how these regulatory T-cells are controlled."

**Do you have any feedback on this newsletter?**

Please contact [rf.pearsinfo@nhs.net](mailto:rf.pearsinfo@nhs.net) with any comments. We'd love to hear from you.

# The IIT in focus

## Chris Denton leads a programme of research at our world-leading centre for the debilitating and often fatal disease, scleroderma.



Scleroderma is a rare but very challenging autoimmune disease with both life-threatening and non-life threatening complications that cause serious problems for patients.

“It not only has the highest mortality rate of any rheumatic disease – about half the patients will die from it – but even those who survive see their quality of life destroyed because of its effects on key functions and appearance.”

His is one of the largest centres for clinical care of scleroderma in the world with about 2,000 patients – a quarter of the entire UK population of scleroderma patients – which means it is very well placed not only to understand the basic processes of the disease but also to find better treatments.

“We do basic research in our labs, to try to understand what the causes and mechanisms of scleroderma are, and clinical research among our patients to understand and assess the disease so we can do clinical trials of new therapies.”

Scleroderma is a complicated disease that includes fibrosis – the thickening and scarring of tissue – vascular (blood vessel) disease and immune dysfunction. In the 20 years that Chris has been working on it, research effort has focused on the vascular and fibrotic aspects but the move to the Pears Building will bring change.

### FUTURE OF TREATMENT

“The new expertise and facilities that we will have in the new building will allow us to start looking in much greater detail at the immune side of scleroderma, which is where we think the future of treatment lies.

“We are already using stem cell transplants on patients with the most severe disease, and of course with transplantation being a major focus of the IIT, knowledge in this area will increase quickly. At the moment, because of the high risks of the treatment – there’s a mortality rate of around 10% - this is acceptable only for carefully-selected patients. ”

But he is confident that other treatments will be found that are not so toxic. “Our laboratory research is aimed at understanding what the key links are between the different components of the disease. There are factors, such as proteins and pathways, that are shared between them and which can give us insights, particularly into the immune response.

“And we have a uniquely large group of patients who are very generous in giving us blood and biopsy samples which we can feed into the laboratory science in a way that would simply not be possible without this large patient base.”

### BETTER TREATMENT NOW

He sees clear progress during the years he has been involved. “The improvements have come from better treatment of the specific complications of the disease, particularly in the kidney and lung, and this has translated into substantially improved survival. So although patients may die from scleroderma, they are living on average much longer.

“What I’d like to see in the next five to 10 years are more treatments that tackle the non-lethal aspects of the disease, like appearance and bowel function – those aspects that really make life difficult for patients.

“We want to develop much more targeted treatments that arise out of understanding the biology of the disease and which can often be very effective with a much lower level of toxicity than, say, stem cell transplants.”

And he is sure that the move to the new building will speed up the process. “We will have that very large critical mass of, in particular, immunological expertise working across a large number of disease areas. We’ve noticed that a lot of the progress in a disease like scleroderma comes from applying observations, concepts or science from other disease areas. So by working alongside a larger body of science in this area, as well as the capacity and infrastructure improvements, we hope we will be able to shorten the time from hypothesis to treatment.”



# Q&A

 UCL

with **Janani Sivakumaran,**  
facility manager

## What do you do at the IIT?

I manage the institute's core facility laboratory with highly sophisticated equipment for analysing cells, which help our researchers find better treatments for disease. The core facility consists of flow cytometry and two microscope labs.

Flow cytometry is used to analyse the physical and chemical characteristics of particles in a fluid as it passes through a laser. Cell components are fluorescently labelled and then excited by the laser to emit light at varying wavelengths. It's used in basic research, clinical trials and clinical practice, such as diagnosis and disease management.

A key part of my role is to train researchers in how to use these instruments and help them, should they need it, to design their experiments to optimise its functions.

## What first drew you towards a career in science?

My mum encouraged me to value, appreciate and enjoy education so I was always fond of learning about ideas and how things worked. Science seemed a natural fit for my curiosity, as there's always more to be investigated.

While an undergraduate at UCL, I was taught a unit in immunology by Professor Benny Chain who had such passion for his subject that it piqued my interest. I wanted to find out more so I worked initially as a technician in a couple of laboratories investigating immune function, immune-related diseases and therapies. I enjoyed it so much and learned a lot from Dr Clare Bennett, Professors Ronjon Chakraverty and Mark Lowdell's teams – knowledge that I now use and pass on in my current role.

## What do you enjoy most about your role?

Before I started in this role, I hadn't used a core facility laboratory before so I approached my role in my usual way – as a researcher. I try to make the facility as user friendly as possible, teaching people not only how to use it but how it functions so they can optimise the design of their experiments to get the best results and troubleshoot any issues.

It's always lovely to hear from students or researchers

who've left the department who say they didn't realise how much they had learned and that they are trying to implement similar protocols to those in our facility within their new laboratory.

## What tips would you give someone starting a research career?

Be pro-active about your learning! I've been lucky with the teams I have worked with and in our current department there is an ethos of sharing information, ideas and collaboration.

However well published or successful a research team is, you need to start in a team who are willing and able to teach you.

You also need to be pro-active about your career development. I worked in research laboratories during my summer breaks when I was an undergraduate student and that gave me an insight into how different teams worked, what worked for me and what didn't. Finally, I'd say keep an open mind – read around your subject of interest. Multidisciplinary thinking and collaboration help to move research forward.

## What benefits do you think the new building will bring?

As I've said, there's already a collaborative environment at the IIT, but it's sometimes limited by the scattered nature of our teams – some on the main campus and others on different floors of the Royal Free. Being together in one building will create even more opportunities for working together. We'll also have room to recruit more leading scientists and clinical staff.

## Do you wish you were still doing research?

While doing my PhD in haematology I got very excited about the results and almost forget to go home. I wasn't very good at the whole work-life balance thing. Now I have a 14-month-old son I've had to re-think things a bit. In this role, I am constantly learning about the different research done by the facility users and can support the researchers a great deal but I can do only so much – it's their experiment after all. But that's good because it means I get to go home!