NHS
Royal Free London
NHS Foundation Trust

Community news

Pears

In association with
royal free charity
UCL

Building

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As the seventh floor is reached, the new building is "topped out" with the final bolt put into the steel frame.

Almost a year to the day that a time capsule celebrated the building reaching its lowest point, a "topping out" ceremony has celebrated reaching the seventh – and final – floor of the new building.

Meanwhile, a grateful patient has raised more than £16,000 for research into kidney transplantation, and eight students are the first to embark on a new degree.

Also inside we meet Professor Ben Seddon, whose research uses maths to try to discover the patterns that underlie the ways our body remembers past infections to protect us from future infections.

Building update and IIT news

Prof Hans Stauss and Prof Emma Morris add their named bricks to the charity office wall.

The last bolt is fitted

Sir Trevor Pears, executive chair of the Pears Foundation, led a ceremony to fit the last bolt into the steel frame of the Pears Building on 15 October, marking a milestone in the creation of the new home for the Institute of Immunology and Transplantation (IIT).

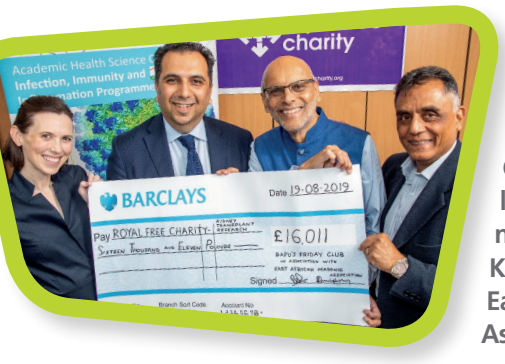
More than 50 people took part in the event, which included guests writing their names on bricks and laying them into a wall that will remain visible in the charity's new office for the life of the building. The building is still on schedule to be completed in September 2020.

Work continues on the detail of the external envelope of the building, including the brickwork, window frames and glazing. The fitting-out of the inside has begun, with partition walls at levels 2 and 3 and the installation of mechanical, electrical and ventilation systems on levels 0 and 1.

Detailed planning of the equipment and furniture to go into the laboratories, offices and patient accommodation is complete and the IIT has begun recruiting to new posts that the enlarged institute will be able to accommodate.

Local people, including volunteer gardeners who work for the charity, are being consulted concerning some of the planting for the grounds of the new building.

Patient raises £16,000 for research



Fundraiser Pradip Patel (right centre) and his surgeon, Reza Motallebzadeh, flanked by Ciara Magee (far left), consultant nephrologist, and Kanti Mistry of the East African Masonic Association.

A grateful patient has raised more than £16,000 for kidney transplant research led by Reza Motallebzadeh at the IIT.

Pradip Patel, known as Bapu, received a donated kidney in December 2017 after 19 months of dialysis following acute kidney failure. "The generosity, selflessness and brave decision of the deceased donor to donate his organs has given me the opportunity to continue living life, a life I now truly cherish," he said.

Mr Motallebzadeh was one of his surgeons and when Mr Patel heard about his work to reduce the rejection of transplanted organs, he decided it was time to "give back".

The research work focuses on the role of the body's microbiota - made up of micro-organisms including bacteria, viruses and fungi - in organ rejection, and aims to uncover the mechanisms underlying both acute and long-term rejection.

"I'm particularly interested in the role of the host microbiome, which we know communicates with the immune system, " said Mr Motallebzadeh. "We think that disruption to this "crosstalk" can affect the repertoire of immune cells that can determine the outcome for patients after transplantation, either through rejection or infection."

His team's work involves monitoring patients' urinary and gut microbiome after kidney transplantation to see how it has been affected by the surgery and attendant treatments, including antibiotics and immunosuppressive drugs. He hopes this work will lead to the development of novel therapies to promote longer-term kidney transplant function.

Mr Patel said being a recipient of a donated kidney had opened his eyes to the benefits of joining the organ donor register and urged others to do the same.

The IIT in focus

Focus on the IIT

How does the body remember infectious threats it has met before and protect the person from getting the same disease, for example childhood infections such as chicken pox or after vaccination? This is the puzzle being worked on by Professor Ben Seddon and his team.

"My team does the more fundamental research – the kind of work needed before we can get to the point of being able to translate understanding into treatment," explained Prof Seddon.

"We want to understand how immune memory works – how your body remembers whether or not it can fight off a particular infection or disease. This is important because it's how vaccines work and is now also being exploited by some immunotherapy treatments against cancer."

It was recognised as far back as 430 BC, during the plague of Athens, that people who had survived the disease could nurse people with the disease without getting ill again. Although this and later observations were exploited by Edward Jenner and Louis Pasteur in the development of vaccination, the underlying mechanisms still have to be uncovered if we are to be able to develop all the vaccinations and immunological treatments we need.

"We still don't fully understand how immune memory functions and how the immune system manages to remember that chicken pox encounter it had as a child or a cold that's going around, " said Prof Seddon. "We don't have vaccines for the common cold, HIV and malaria, for example. So there's still a lot of work to be done."

One of his key tools is mathematics. "We try to understand how memory works as an integrated system, using computer models and simulations. We want to be able to predict how the immune system can remember things and understand the rules that control that process.

Immune system memory

"It's similar to the way that meteorologists use computers to predict the weather - they have an understanding of how weather systems work and the rules of high and low pressure, so they can make predictions. That's the sort of approach that we use.

"We want to understand how immunological memories work using computer simulations and models, then we can make predictions about what's needed to make a good memory and how long it might last. We can then apply that knowledge to making more, and more effective vaccines."

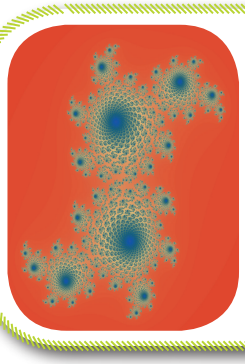
Another potential benefit of this work is the ability to understand the ageing process better and help people live healthier lives for longer. "People's immune systems start to slow down and there's a risk that it is not working properly as you get older. This is a real problem."

Finding room for cells

T-cells are at the core of his research. "What we're trying to understand at the moment is the sort of population dynamics within the T-cell memory. Memory is 'encoded' in our immune systems by different populations of memory T-cells for each infection. You can imagine that when you get a cold you're going to be making new memory cells and one of the big questions is how are you going to manage all these different mixed populations?

"You have memories from your vaccinations, from your encounters with colds and illnesses and you've got to store all these in limited space. How does the immune system decide which ones to keep and which ones to let go?"

He said that mathematics was the "perfect" language for expressing and understanding these cell behaviours. "Mathematics can distil the highly complicated behaviours that govern these systems into very simple rules. It probably wouldn't cross your mind when studying maths at school that one day you might use a simple equation to express a highly complex aspect of the human immune system, but it is a very practical application of maths."



Example of a fractal: a simple equation allows infinite numbers of different patterns like these to be generated. The body is full of fractals so we can use fractal maths to quantify, describe, diagnose and perhaps soon to help cure diseases.

He's looking forward to the move to the Pears Building. "I'm hoping that with a greater number of researchers coalescing within the Pears Building, there will be more opportunities to interact and find new applications for our mathematical approaches and analyses. It will be a great chance for us to explore and translate our ideas into a more clinical setting."

Some of the students learning about the kit in an IIT lab

First students start innovative course

The first students to study a new degree at UCL have started work alongside leading research scientists at the IIT.

Eight undergraduates are studying the three-year BSc in infection and immunity, six from the UK and two from overseas, which will give them significant insight into how scientific discoveries are made at the highest level.

"Students will look in depth at the immune system and the infections that cause disease," said Milica Vukmanovic-Stejic, principal teaching fellow in immunology. "They will gain insight into the latest thinking and research into the prevention and control of infectious diseases and the underlying mechanisms of the immune system and what can go wrong with it."

"Infectious agents are fantastic tools for discovery in cell and molecular biology, immunology, human biology and evolution, so the BSc Infection and Immunity is a great way to acquire a broad biomedical science knowledge."

The students on their induction tour of local landmarks

The students will be taught by the most senior research scientists at the IIT, the principal investigators, and will spend their first year in laboratories at the Royal Free Hospital and in their third year they will conduct research projects in the Pears Building.

As part of their induction, the students completed an orientation exercise within the Royal Free Hospital building and the surrounding area. This took them on a 2.5-mile route and included a quiz covering notable figures in medicine and famous people who have lived in the surrounding streets.

More information about the course, including entry requirements, is at https://www.ucl.ac.uk/infection-immunity/study/bsc-infection-and-immunity