NHS
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Community news

Pears Building

In association with
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UCL

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Jon Spiers, chief executive of the Royal Free Charity, takes delivery of the building, flanked by Caroline Clarke, chief executive of the Royal Free London NHS Trust (left) and Professor Hans Stauss, director of the UCL Institute of Immunity and Transplantation.

Building handed over

Teams prepare to move in

Ground-breaking COVID research

Immunity experts to move into the Pears Building, an ultra-modern facility which will allow them to work more closely with clinicians to develop treatments and cures for some of the most devastating diseases of the immune system.

The Pears Building, which was recently handed over to the Royal Free Charity by Willmott Dixon, the construction company, has been created as a result of a groundbreaking collaboration between the Royal Free Charity, UCL and the Royal Free London NHS Foundation Trust.

It will not only bring the theory and implementation of research much closer together but will also allow the public easy access to the latest discoveries in immunology.

The Pears Building is handed over

The atrium

A laboratory

A room in the patient accommodation

The completed building will be the new home of the UCL Institute of Immunity and Transplantation (IIT), in Pond Street, Hampstead, one of the largest patient-focused immunology centres in Europe.

Designed by the multi award-winning firm Hopkins, the Pears Building has a light-filled interior with dramatic acoustic panelling and bespoke timber meeting room "pods". These, and other spaces in the building, are designed to maximise the opportunities for interaction, not only between users of the building but also between researchers and their clinical colleagues in the neighbouring Royal Free Hospital, and with the surrounding community.

The building will accommodate up to 200 researchers looking for cures and new treatments for global health problems including type 1 diabetes, cancer and organ rejection after transplantation, enabling it to attract further world class talent. They will work in the most up-to-date laboratories with adjacent write-up facilities.

Local people will also be welcomed into a community café and invited to face-to-face updates with researchers, who will also maximise opportunities for patients to take part in clinical trials. Those taking part in research will be offered accommodation on the top floors of the building, many with stunning views across Hampstead Heath.

The building will also contain offices for the Royal Free Charity and include a 71-space car park for patients and visitors. It has been designed to complement the local area, with set back terraces on the upper levels which allow light into the spaces behind the building and create a silhouette which defers to the nearby Grade I listed St Stephen's Church.

"In the Pears Building we have a world class laboratory research facility and a beautiful space designed to facilitate a unique partnership between scientist and clinician," said Professor Hans Stauss, director of the IIT. "This will enable us to convert discoveries made in the laboratory into cures and treatments more quickly."

Searching for answers in COVID-19

Two IIT scientists are leading important studies into how people's immune systems are coping – or not coping – with the virus that causes COVID-19.

Mala Maini, professor of viral immunology at the IIT, describes the work of a UK consortium she is helping to lead as providing vital insights into the immune response to this virus.

"Our immune response to a virus is really what dictates how we respond when we get infected, how ill we get when we get an acute infection, how long we're protected after we've had the infection and how well we might respond to a vaccine," said Prof Maini. "The immune system underlies everything that's key to the response to this virus."

The UK Coronavirus Immunology Consortium (UK-CIC), comprising scientists from 17 UK research centres, has received £6.5 million from UK research bodies to answer questions such as how long immunity lasts and why disease severity varies so much.

Complex response

Using funds from the UK-CIC, Prof Maini and Dr Leo Swadling teamed up with the Barts and Royal Free Covidsortium to study health care workers four months after mild or asymptomatic infection. Their collaborative study was published in the journal Science Immunology in December 20201.

"This study is one of the most complete accounts of immunity to COVID-19 generated in individuals who experienced mild or asymptomatic infection," said Prof Maini. "Our results show that the immune response following COVID-19 is complex, with varying contributions from the complementary actions of antibody and T-cell responses in different individuals. This highlights the importance of making sure that we study both aspects of immune protection when trying to understand immunity to COVID-19."

Understanding how immunity is generated in individuals with mild or no symptoms is helping the teams to understand their levels of protection after natural infection or vaccination.

Prof Maini said that for mild-to-moderate cases of COVID-19 the immune response seemed to be "textbook". She said: "All the right components of that complex immune system seem to be working together well."

The Covidsortium included researchers from the Royal Free London NHS Foundation Trust, Imperial College London, Queen Mary University of London, Barts and the London School of Medicine and Dentistry, Public Health England and Barts Health NHS Trust.

The group analysed immune responses in 136 London healthcare workers, 76 of whom had a mild or asymptomatic COVID-19 infection, and an uninfected control group. These workers were part of a larger cohort followed from the start of UK lockdown in March 2020.

Each week, every healthcare worker took a polymerase chain reaction (PCR) test, had their blood analysed and kept a symptom diary to allow the researchers to record any COVID-19 infection and the subsequent responses by antibodies and T cells - a type of white blood cell.

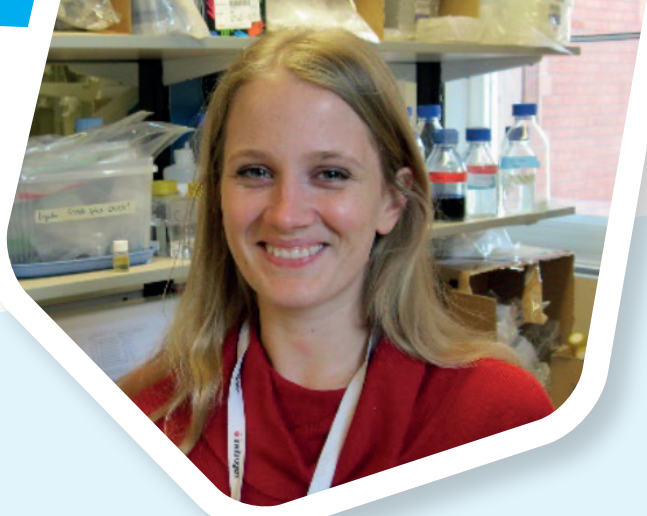
Out of the healthcare workers tested at 16-18 weeks post mild or asymptomatic COVID-19 infection, 89% of them had neutralising antibodies present in their blood, with high levels likely to correlate with functional protection present in 66%.

"This is important because this is the type of antibody that stops the virus entering cells, thereby potentially protecting against reinfection," said Prof Maini. "The majority of individuals also had a range of T cells in their blood that could recognise different parts of the SARS-CoV-2 virus. T cells can help to direct effective antibody responses as well as providing a direct added layer of protection by removing any cells that the virus has managed to infect."

When the researchers analysed the results further, they found that some had mismatched antibody and T-cell responses, suggesting that these two types of immune response can complement each other, with some people showing T-cell immunity but no evidence of antibodies, and vice versa.

"We are understanding more and more all the time about how people's immune systems respond to COVIJD-19," said Prof Maini. "But we still have a way to go and, in the meantime, whether people have had the infection or not, they should continue to follow government guidelines to minimise the spread within our communities."

1. https://immunology.sciencemag.org/content/5/54/eabf3698



Dr Laura McCoy, MRC career development fellow, and her team have shown in the laboratory that antibodies in people previously infected with coronavirus can stop the virus from infecting cells.

She also found that these infection-induced antibodies can prevent infection by the new UK variant, as she and her fellow authors have explained a paper in Cell Reports1 in March.

Her studies focused on the now famous "spike" protein which the virus uses to unlock and invade human cells, so it can reproduce, and used samples kindly donated by two groups of people.

The first group of samples came from people infected in the first wave of the pandemic early in 2020 and who, because they were very unwell, were admitted to the Royal Free Hospital. The second group, also sampled in the first wave, were from healthcare workers at University College London Hospitals NHS Foundation Trust who had had a mild infection.

Dr McCoy's team discovered that both groups had developed antibodies, but the level was generally higher in group one most likely because they had endured a greater dose of the virus.

Dr McCoy said: "We then changed the spike in lots of ways, based on the original, 2002 pandemic (SARS) virus and we compared the antibody responses to the original and then the mutated virus. We found that those in group 1 showed a good response and those in group 2, with mild disease, had slightly less resilience but mostly were still able to block the mutated virus."

The study also looked at different types of antibodies and showed that those found in people's blood were more able to resist infection than those usually used in laboratory work.

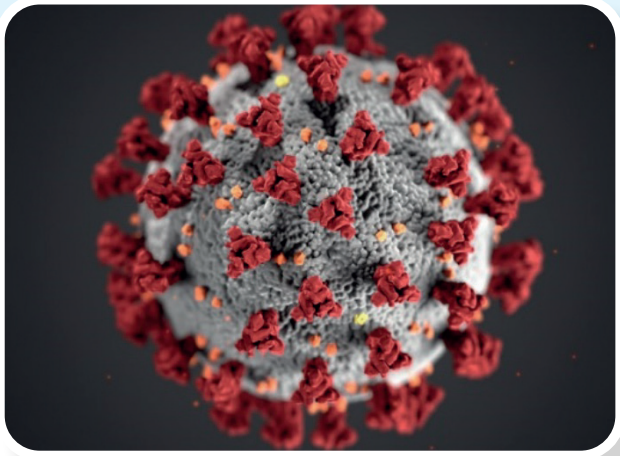
"Labs often use monoclonal antibodies – literally a clone from one white blood cell – whereas serum, or blood, has a much more diverse array of antibodies," said Dr McCoy. "When we studied about a dozen antibody clones isolated from patients' blood, we found that many of the clones were knocked out by the mutations but the group of different antibodies in serum together could fight it off."

Out of samples taken from 36 people, the researchers found they could block infection by the UK variant as well as for the original virus in all but about 10% of samples, which showed a significantly less effective response.

"We know that those who have had the vaccination have antibodies which seem to protect them against being unwell and may prevent transmission of the virus. What we need to do more work on is the level of antibodies needed to provide protection.

"The most important thing that our data shows is that the vast majority of people who have antibodies are able to block the UK variant in the lab and this suggests that those who receive the vaccine will have resistance to the new variant."

Dr McCoy has also worked with Dr Dimitra Peppa, based at Oxford University, on a study published in February2which has shown that people with HIV infection make very similar antibodies to the pandemic coronavirus as people without HIV and are therefore likely protected to the same level.



1. https://www.cell.com/cell-reports/fulltext/S2211-1247(21)00204-7

2. https://pubmed.ncbi.nlm.nih.gov/33619489/