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2022 LIFE SCIENCE MILESTONES

By Tahrima Rahim

2022 saw some significant scientific developments. We saw huge strides being made in the life sciences with themes ranging from quantum to artificial intelligence (AI); perhaps not immediately synonymous with life sciences but each has a crucial impact on the industry and the potential to revolutionise how future medical advances are made. The themes are further indicative of the trends in the life sciences industry currently and the direction of research. Further downstream, these trends will impact real estate demands by way of life science occupiers having slightly different requirements to which we are traditionally used to seeing. Below is a summary of the some of the year's biggest advances.

AI predicts protein structures

In July 2022, scientists announced AlphaFold, a revolutionary new AI network, which can now predict the structure of over 200 million proteins originating from 1 million species. The significance of this development is transformative for research. Proteins are responsible for a vast number of biological processes in the human body; how diseases develop, how the immune system works, how viruses and bacteria impact the body, how medicines are discovered and made – the list is endless. Scientists need to be able to unravel the physical structure of proteins in order to understand their significance and impact in these biological processes. This information can be a laborious, expensive and time-consuming process to glean by using traditional methods, therefore predictive AI will truly change the efficiency of this research. Occupiers who work on such projects will most likely have dry laboratory requirements with an emphasis on excellent connectivity and storage capabilities.

Impact of COVID on vaccine research

The global concerted effort behind developing the COVID-19 vaccine has given vaccine research a huge boost. Historically, designing a new vaccine takes a significant amount of time, investment and labour. The increase in new findings behind vaccine technology during the pandemic has given scientists a better understanding of how vaccines can be made more efficiently. For example, the COVID-booster vaccine is based on previously unknown science and it was only possible to develop it in such a short time because of the research carried out for the original COVID-vaccine. It is known as a bivalent vaccine which can target two strains of a virus, whereas previously a vaccine could only treat one strain at a time. Researchers are looking to expand the repertoire so that the vaccine may target more than two strains within one dose therefore mitigating the need for things like an annual flu jab. The success of vaccine development has seen an influx of manufacturing in the UK and we will likely see an increase in demand for sites with manufacturing capabilities.

First pig heart transplanted into a person - Xenotransplantation

In January 2022, doctors for the first time successfully transplanted a genetically modified pig heart into a person. Another team of doctors, independently transplanted pig kidneys into three, legally declared dead people, and found that not only did their bodies not reject the kidneys (a common challenge in xenotransplantation) but the kidneys actually produced urine. The next step is to carry out clinical trials to test this development in living people. This is especially significant as it could provide the basis of animals being a reliable source of organs for those who might need them.

AI reveals new antibiotics

Antibiotic resistance is a global problem where doctors are struggling to treat infections because the bacteria causing the infection are resistant to the antibiotics. The Lancet reported that in 2019, 4.95 million deaths worldwide were caused by such antibiotics-resistant bacteria. Scientists have been battling with this challenge for years but multiple research groups have reported using machine-learning AI analysis in 2022 to identify the genetic sequences of microbes in the gut which have an anti-microbial effect. Furthermore, the identified sequences do not resemble sequences of known anti-microbial sequences. These discoveries, thanks to the AI technology, have been achieved at a far faster rate than with traditional methods. These studies ultimately promise rapid and effective routes to drug discovery for infections doctors currently have no effective treatment for. There were numerous milestones in 2022 attributed to our improved understanding and use of AI and we will continue to see this in the coming years. We believe that the real estate industry can expect to see an increasing number of tech companies seeking real estate clustering with more traditional life science companies as they continue to work in close collaboration.

Quantum computing takes Nobel Prize

In October 2022, the Nobel Prize for Physics was awarded to three pioneers of quantum science; Alain Aspect, John Clauser and Anton Zeilinger for their contribution to understanding quantum entanglement. In short, quantum entanglement is when two quantum particles need to be considered as a single entity because when one is influenced, the other is also affected despite being far apart from each other. The research and insights gained into this field lays the foundation for quantum computing technology and quantum encryption. The ambition for quantum computing, once fine-tuned, is to allow real-life processes occurring in the human body to be modelled on a computer to the precise detail it would occur naturally. This will ultimately progress the speed of research into diseases and similar at a previously never-before-seen pace. Similarly to AI, quantum computing companies will have real estate requirements that look very different to a traditional life science company, and given just how cutting-edge this sector is, the real estate industry must work closely with these occupiers to better understand their needs.