

Kate Pretty Lecture – Thursday 8 March 2018

Pascal Soriot, CEO AstraZeneca

What Science Can Do – The Cambridge Cluster at a Pivot Point

Introduction

Thank you for your invitation and warm welcome to Homerton College.

It is a privilege to be here today in honour of Kate Pretty, an extraordinary leader who has worked tirelessly to help shape the incredible College you see today.

A connection we have is unexpected: one of the first discoveries that AstraZeneca made in Cambridge – independently from our scientific heritage here through Cambridge Antibody Technology and MedImmune – were Roman archaeological remains, when we started to prepare the ground for the construction of our future home on the Cambridge Biomedical Campus. These are now in the safe hands of the University and we have you to thank, I am sure, Kate, for many of the skills of that department.

Another connection we have is our attraction to Cambridge, Homerton College relocated from London and we relocated from Manchester and London. Your association with Cambridge is much longer than ours of course but our commitment to building a great organisation and contributing to Cambridge and society at large is very strong too.

We also share your passion for teaching and continuous development and are supporting training programs in partnership with local institutions, I will give examples of these later.

We will soon be neighbours as the construction of our new global corporate headquarters and R&D centre progresses a short distance from here, at the Cambridge Biomedical Campus. In fact, we already are since our existing central Cambridge offices are a few doors away on Hills Road.

I'd like to start by congratulating Homerton on your 250th anniversary, marking a milestone and celebrating a remarkable legacy.

As you point out, this year also happens to be the 500th anniversary of the Royal College of Physicians, the 250th of the Royal Academy, and the year the

New Royal Papworth Hospital opens in Cambridge – a significant year for science and healthcare!

So let me speak about our relocation to Cambridge and the rationale that drove our decision making, it was a hard decision but the right one. Why are we here?

MedImmune, our global biologics research and development arm, has already been based in Cambridge for over 25-years with its roots in Cambridge Antibody Technology. Bringing our Medimmune and AstraZeneca scientists together here in Cambridge in our new site will further increase collaboration and sharing of ideas.

But more than that, as a global bio-pharmaceutical business, we have an ambition to follow the science and push the boundaries of what is known today, to deliver innovative life-changing medicines, which transform patient care around the world. It's hard to find a better place to carry out ground-breaking science than in Cambridge.

Across this city, we work side by side every day with world-leading scientific experts and collaborate with world class academic research institutions,

hospitals and cutting-edge biotech companies. There are 300 biotech and related companies based in the city and many in the region.

Our move will put us at the heart of the Cambridge Biosciences Campus – neighbouring the Laboratory of Molecular Biology, the Cancer Research Institute, The Institute of Metabolic Science, Addenbrooke’s hospital and the new Papworth Hospital. And our address is not the least exciting aspect of this relocation: 1 Francis Crick Avenue! Even better than my Genentech friends at 1 DNA Way in San Francisco...

We now have a team of over 2000 staff in Cambridge all working hard to build the right kind of collaborations and partnerships to continue to deliver on our mission of discovering new innovative medicines. We want to collaborate, operate in a porous environment where ideas can be shared. Our new R&D site at the CBC will minimize security (pharma companies are historically very secretive and have tight security) and we have designed our building so it is open to the external world, invites others to visit us and supports the creation of this porous environment I was talking about.

Before I go further into my talk, let me clarify that when I use the word AstraZeneca, I use a broad definition that includes Medimmune, our biologics division. If I need to refer to the AZ Innovative Medicines Unit or Medimmune, I will be specific.

Clusters

This lecture is entitled “What Science Can Do – The Cambridge Life Science Cluster at a Pivot Point”. Let me explain what I mean by a “cluster”.

Clusters are dynamic networks of inter-connected organisations, operating within a specific sector and close to each other. They foster a culture of collaborative working and innovation that drives economic growth and prosperity. They are characterised by a high volume of interactions, which lead to the development of new ideas and products. Silicon Valley is a great example.

In biosciences, these clusters are created by the interaction of academic scientists, entrepreneurs and investors. The number one cluster in the world for life sciences is in Boston with San Francisco a close second and there are a few others in the US: New York, San Diego, Maryland.

The Cambridge cluster is Europe's largest and includes many world leading academic institutions, biotech companies, and the venture capitalists. Around 57,000 people are employed here by a vast number of firms with an annual combined turnover of over £13bn. It is also connected to London and Oxford as part of the broader Golden Triangle where most of UK Bioscience activities are located.

The scale of our own collaboration with Cambridge academia has increased tremendously in the last 5 years and is very large today. We had less than 10 collaborations 5 years ago, we have about 130 today across oncology, cardiovascular renal and metabolic and respiratory disease. We also have great partnerships with leading biotech companies.

Examples of our science-led collaborations with Cambridge based institutions include:

- Our partnership with the Laboratory of Molecular Biology (LMB), where many investigators are now collaborating with us. This has been a tremendous success and already generated some high impact

science. One highlight is our collaboration using CryoElectron Microscopy to solve the structures of key targets in the DNA damage response pathway. As you may know Dr Richard Henderson from the LMB was awarded the 2017 Nobel prize in chemistry for his work on cryo-EM and we are hugely honoured to be working with him and his team.

- We also have a great partnership with Cancer Research UK, working together on key aspects of cancer biology and precision medicine as well as the potential for combination treatments. We have a number of trials in place as well as a successful symposia program.
- We have a 5-year strategic relationship with the Department of Chemical Engineering and Biotechnology, which is another example of how we can solve shared problems in the advanced manufacturing space. One outcome from this is the use of machine learning and image analysis to assess the correlation between viral particle shape and efficacy as a vaccine. Our hope is that this leads to further advanced manufacturing investment and building expertise in this area and aligns to the government's industrial strategy.

- We have established a collaboration with Bicycle Therapeutics to identify and develop bicyclic peptides for the treatment of respiratory, cardiovascular and metabolic diseases.
- A collaboration with Microsoft to develop a new cancer treatment modelling system.
- We have also launched an integrated genomics initiative and based our Centre for Genomics Research in Cambridge.

Being part of the very best biotech hub is an integral part of delivering our strategy, not just an optional extra. Our strategy is to work with the best science and our culture values collaboration and openness. We believe that, by being here in Cambridge, we can collaborate with some of the best scientists in the world, benefit from their insights and bring them our own scientific expertise as well as our understanding of drug development and the medical needs that we should be addressing urgently.

We believe that, together, our depth of scientific expertise and entrepreneurial and business strengths will act as a catalyst: to activate great ideas and convert more of this early science into successful medicines.

An example of the impact our approach to research has delivered in the last 5 years, supported significantly by our presence in Cambridge, is publications. 5 years ago we recorded less than 10 publications in high impact journals (Nature, Science, Cell...), last year we published 82, reflecting the great progress of our science. This is more than all our peer companies except possibly one, including many who have an R&D budget that is double ours.

We hope that over time we can turn this great science into innovative medicines that help physicians better address the many diseases that require better or even new treatments.

We also hope that these discoveries will drive our company growth. I am proud to say that more than 70% of our sales growth from 2015 to 2023 will come from products invented in the UK or that our UK team made a very substantial contribution to their development. The work we do in Cambridge will no doubt

help us further support this great result for us and for the bioscience sector as a whole in this country.

So what will we in turn bring to Cambridge and the Life Science cluster?

The sector as a whole in the UK employs more than 200,000 scientists and staff. In Cambridge – one of the world’s top three life science clusters – it provides over 15,000 full time jobs. We hope we can contribute to the growth of the Cambridge life sciences cluster through our investments and our people. Some of our people over time will leave us to join start-ups and bring them the necessary skills in pharmaceutical development, regulatory affairs and the many other functions that are key to turning a brilliant scientific idea into a product that can help patients. They may leave us to set up new start-up companies. I worked at Genentech in San Fransisco for a number of years. Today, I cannot visit a small biotech company in San Fransisco without bumping into Genentech people, they know I worked there and they proudly introduce themselves as ex-Genenetechers. They are bringing their skills and experience to other smaller companies in the San Fransisco cluster.

We are also supporting the local community through training and collaboration programs, I would like to mention a few:

- **Experimental Medicine Initiative.** This strategic programme developed by Professor Ian Wilkinson and Tim Eisen, the latter a fellow of Homerton College and oncologist and VP at AstraZeneca, is a joint initiative between the University of Cambridge, Cambridge University Hospital, the NIHR Cambridge BRC. Significant co-funding from the BRC and CUHFT complements the investment from AZ/MedI. Dr Ben Challis (AZ) and Dr David Howe (MedI) are the current co-directors. The focus is on training the next generation of clinician scientists in early phase clinical trials involving novel therapeutics. AZ/MedI has committed co-funding for 8 Academic Clinical Lecturers (ACLs – clinical post-doctoral positions) and 4 clinical PhD students over a four-year period. This collaboration has allowed us to contribute to developing capabilities in the clinical community in a teaching hospital.
- We are supporting various **PhD programs** across multiple Cambridge university departments. These are connecting us with joint research projects across pretty much all areas of the university and across our

own science units of Innovative Medicines and Early Development and MedImmune.

- We recruit **60 post docs** every year (out of 4000 applicants). We know some of them will stay with us, others will join smaller companies.
- We also have a partnership with the Business management side with the **Judge Business School**. We participate in their entrepreneurship programs, mentor their students and work with them to encourage and coach local start-ups to help them be successful. This reflects the fact that our global headquarters are based in Cambridge and as a result we have expertise in areas that are not directly related to science: finance, HR, business development, to name a few. It is very much a two way street: our mentors provide their global business skills and in return are challenged by the fresh, entrepreneurial thinking and questions asked by mentees.
- Finally, we also have an ongoing commitment to STEM programmes in the local community, through partnership with the Cambridge Science Centre, and direct engagement with local schools. Many of you will have

seen the artwork on the hoarding around our construction site on the CBC, reflecting a STEM programme involving over 400 pupils in Cambridge schools.

Another aspect of our contribution is our efforts to shape government investment as it relates to infrastructure. We worked very hard to obtain the decision to build a new train station at the CBC. This will simplify transport for the people who work on the campus but also for patients and visitors at the two hospitals. It will also reduce the congestions around the main train station in the city. We all know how smooth the car traffic is in Cambridge so anything that can reduce the number of cars on the road is welcome. We will also introduce a programme incentivising our own employees to not drive their car to work when we move to the CBC.

Finally, we want to create jobs and economic activity with minimal impact on the environment. With that in mind, we designed our building to be at a high standard of sustainability, we will for instance have the biggest bore hole system in the UK to heat and cold the building through ground-source heat pumps.

Science and healthcare innovations – so what next?

So what does the future of science look like? It is key that the Cambridge cluster is able to continue this vital collaborative work to ensure the UK remains a great place for science and innovation.

The delivery of new medicines will rely on a more advanced understanding of disease and the use of new technology and approaches. These include precision medicines, genomics and digital healthcare.

For instance, NiCoLA-B will be housed in our new R&D centre and is the world's most advanced drug discovery robot. Developed with our scientists, it enables us to test up to 300,000 compounds a day, which is three times faster than previous drug discovery robots. Our Open Innovation platform lets our partners, such as Cancer Research UK and the Medical Research Council, collaborate with us in our use of NiCoLA-B. This collaborative approach helps us to accelerate medicines research for the treatment of a range of diseases where there is a substantial unmet need.

Healthcare is undergoing a transformation, driven by data, computing power and smart techniques such as AI. The life sciences sector is a key area, set to take advantage of this boom.

For example, we are currently using machine learning to intelligently identify patterns in very large clinical data sets. The patterns can identify groups of patients who are more likely to have an increased benefit from a certain medicine. It can also identify what characteristics such as genes, or demographic measurements, define those patients.

Big data and related techniques may represent huge opportunities but we also need to navigate with due care and attention the ethical, legal, regulatory and scientific issues that go with them.

What else do we need to continue building the Cambridge cluster?

We certainly need better infrastructure. Cambridge needs to create the infrastructure to support growth in the city. This includes transport and housing. The railway between Oxford and Cambridge I think would be the most impactful development to support innovation as it will join two power houses of academic science.

In a post Brexit world we need to make sure we are working together to make the UK and Cambridge attractive to top talent from outside the UK. The university, corporations and the cluster as a whole need to be working together to make Cambridge highly attractive and welcoming to the best brains from outside the UK.

The UK's Industrial Strategy, which makes an ambitious set of recommendations on how the UK can build a world-leading position in the Life Sciences and help to drive economic growth, will be critical in realising this ambition of global competitiveness. It will also provide an opportunity for Cambridge to grow its global impact even further.

But there must also be increased government investment to help make the UK the best place in the world to do things like genomics research, including using the resources of the NHS and exploring novel regulatory pathways that will ultimately provide better outcomes for patients.

Conclusion

As I draw to the end of this talk, I wanted to just reflect on your 250th anniversary celebrations, which are focused on one theme - "Cambridge Now".

And today, here within our Cambridge Life Science cluster we are at a pivot point and each of us here today has a role to play. Our ultimate goal is to improve the lives of people. By developing new treatments for people suffering from diseases that cannot be cured today, by creating great jobs through economic development, by investing in the training and development of people. And also by creating a great culture of boundarilessness, great collaboration between academia, industry, entrepreneurs, financiers, government. Break down the barriers of mistrust and show the world that by trusting each other and working together we can improve the future of mankind.

With that in mind, what could be more exciting for all of us here than playing a key part in shaping the next 800 years of global impact and local community in Cambridge.

Q&A

Thank you. I would now to like to invite any questions.