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# The rise of Abcam: advancing life science research

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**Abstract:** Abcam plc. - headquartered in Cambridge, UK, employs over 1,000 people across twelve locations globally and serves researchers and clinical communities in over 130 countries. The company provides highly validated antibodies, other binders and assays. Their catalogue offers more than 120,000 products and multi-lingual technical support. Abcam is a listed company on the AIM market of the London Stock Exchange and has offices and labs in UK, USA, China, and Japan. Abcam is running towards its ambition of becoming the most influential life science company for researchers worldwide.

**Keywords:** Abcam, antibodies, life science, Johnathan Milner, Tony Kouzarides, Cambridge, Cambridge ecosystem

## 1. The success story

Headquartered in the UK, Abcam plc. is one of Britain's biggest biotech success stories [1]. The Company was founded in 1998 by the researchers Jonathan Milner and Tony Kouzarides (Professor of Cancer Biology at University of Cambridge and now Deputy Director of the Gurdon Institute in Cambridge). Providing the research and clinical communities with tools and scientific support, Abcam offers highly validated antibodies, other binders and assays to help advance the understanding of biology and causes of diseases. A global company with over 1,000+ employees, Abcam has offices across the US, China and Japan [1].

When paper catalogs were the norm, Abcam was the first life sciences company to sell online products accompanied by data about their technical specifications, validation and usage. The Company was a pioneer of customer reviews allowing its customers to rate products and submit feedback, positive or negative, to share with fellow researchers, around what did and did not work. This data has been hugely useful to researchers when selecting and using their products.

Saving researchers' time, by providing products that work well is important to Abcam. The reproducibility crisis is a key concern for the life sciences industry with reports stating that around 50% of budgets for protein-binding reagents are wasted globally due to non-specific

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and inconsistent research [5]. Ensuring that researchers have good validation data is fundamental to help them choose the right antibodies and assays for their experiments and to guarantee the reproducibility of their research. Abcam has made a big impact raising industry quality standards and was the first antibody provider to introduce knockout validation at scale across its catalog [2,4]. It now has over 1,000 KO validated antibodies and that number is growing each month [1].

Today, Abcam is a multi-billion dollar company. The total reported revenue in June 2017 was at £217.1m [3], with sales spread around the world.

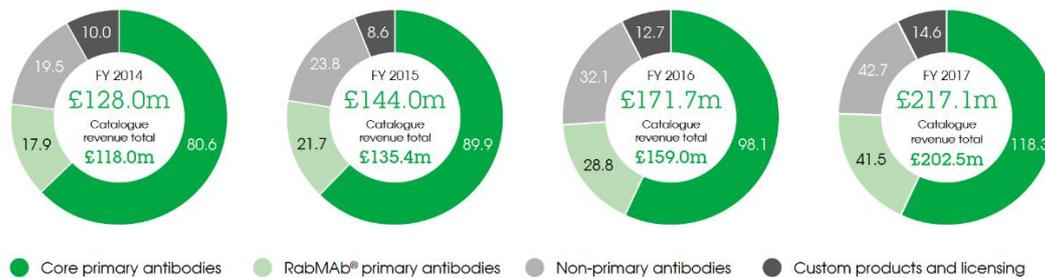


Figure 1. Product revenue since 2014 [3].

## 2. Where did it start

In 1994, after graduating from his PhD at the Leicester University, Johnathan Milner (Figure 2) moved to Bath to start a postdoc position on antibody engineering sponsored by Pfizer. During this period, his future wife, Rosy, received an interesting job offer as manager of Cambridge Contemporary Art and thus Johnathan and Rosy decided to move to the flourishing university city. At that time, Jonathan was still focused on hands-on research, so he applied and obtained a position as a postdoc with Prof Tony Kouzarides at the Wellcome/Clinical Research Centre (now Gurdon Institute). By 1998, while Jonathan was in the last year of his postdoc, he started to develop the entrepreneurial seizure that brought about the rise of Abcam. In fact, working experimentally on a protein related to breast cancer, the frustration for the lack of good quality antibodies became unbearable and Jonathan started to think about opening a company where antibodies, described with lots of data and feedback, could be bought online as Amazon.com was just starting with books and other small things. Serendipity came into play when, at a late Christmas dinner party in January 1998 organised by Rosy and her colleagues, Jonathan had a chance to tell his idea to Dr David Cleevly, a serial entrepreneur who has built and invested in over 35 companies. David readily invited Jonathan to his office to further discuss this opportunity and invited him to find some money on his own to start the company. After remortgaging his house to obtain a starting sum, Johnathan Milner and David Cleevly officially entered into business. Tony Kouzarides, John’s postdoc supervisor, was also very supportive and joined the two in the adventure from the beginning. David, who was not new in the game and knew the importance of a good network of like-minded people, put Jonathan into contact with Cambridge Network personalities, such as Dr Hermann Hauser, Peter Dawe and Dr Stephen Thomas, who supported the company when it did not even have a name yet. In August 1998, Tony found an old room, in the university’s plant biochemistry Annex (the former morgue

in the original Addenbrooke's hospital – now the Cambridge Judge Business School) in which Jonathan could start his company. The Abcam name came into play on a Saturday board meeting, when David, Tony and John were building step by step, the company and Tony simply mentioned: "That's easy, look - Ab for antibody and Cam for Cambridge, makes Abcam" and so Abcam was officially born.



**Figure 2.** Dr Jonathan Milner.

### **3. Our technology**

Abcam has continued to invest in new tools and technologies that will benefit researchers. The Company is close to its consumers and actively listens to and collaborates with the scientific community. Using this feedback, it's able to quickly act on these insights and provide products for difficult targets that might not otherwise be available to researchers.

Its in-house manufactured products are predominantly made by recombinant methods and it now has over 10,000 recombinant antibodies. Recombinant technologies are favoured because they are highly consistent and avoid batch-to-batch variation. The addition of AxioMx's phage display-based in vitro antibody technology means that new monoclonal antibodies can be produced in a matter of weeks rather than months!

More recently Abcam has introduced Next Generation Sequencing (NGS) to its antibody development platforms. This technology is highly valuable because it captures the full immune response in sequence data. It means researchers can get access to rare binders and many more unique clones than other antibody development methods. The fact that the response is sequenced provides researchers with the ability to go back into the antibody library repeatedly to find additional clones that might better suit their needs.

Recombinant technology is also incorporated into the Company's immunoassays which are a growing and successful part of their product range. Immunoassays are used by scientists to detect and analyse proteins sometimes in complex biological samples. To develop the most effective immunoassays, it is best to develop the antibodies from scratch and at Abcam they make fit-for-purpose recombinant antibody pairs for their ELISA kits.

As well as making its own products, Abcam also sources products and technologies from other expert partners that have enabled the company to enhance their products. A partnership with Horizon Discovery, a gene editing specialist, in 2015, to provide knockout haploid cell lines has been particularly successful and enabled Abcam to develop and test antibodies with even greater accuracy. This has changed the validation field raising industry quality standards.

While Abcam is committed to making its own products, a partnering approach is essential in ensuring the company can provide products that researchers require. All its products, whether made in-house or sourced externally are evaluated internally to assure reproducibility and quality data, using the most recent techniques and using insights from the latest scientific papers.



Figure 3. Abcam offices.

#### 4. The journey so far

Abcam has grown enormously over the years and is successfully transitioning from a small high growth company to a sustainable growth business. In 2018, the Company will celebrate 20 years of serving life science researchers. Today it supports approximately two-thirds of the world's 750,000 researchers with life science tools and services in more than 100 countries. It

has twelve offices globally, with over 1,000+ employees, and remains the market leader for antibodies while it continues to grow its non-antibody product ranges.

Jonathan Milner stepped down as CEO in September 2014, after 16 years, in favour of Alan Hirzel, Figure 4. to take Abcam through the next phase of its growth. Jonathan is still involved with the Company as Deputy Chairman of the Board. The Company has attracted strong talent across all levels of the business.



**Figure 4.** Alan Hirzel, CEO.

Over the years, Abcam has been recognised for its achievements through numerous awards for its product and digital innovations. More recently it won two CiteAb 2017 antibody awards. One as best antibody company of the year, a prestigious award that recognises the most successful antibody company based on CiteAb data; and a further award for the most exciting antibody validation initiative. The latter was awarded to Abcam for the impressive knockout (KO) validation testing it recently introduced. This has been a major effort from Abcam to ensure its antibodies are specific and provide reproducible results.

It has been a successful journey for Abcam over the last 19 years, which has seen the Company diversify its product ranges through acquisitions and partnerships to become more than just an antibody provider.

Central to its success has been the focus of the researcher, listening closely and keeping in touch with customers. Understanding where the Company is doing well and where it can improve upon providing quickly what the researcher needs.

## **5. Looking to the future**

Abcam is well known for being a leader in research antibodies and is constantly evolving to provide new scientific tools for research [6]. In recent years, using its expertise in antibody manufacturing, Abcam has developed its custom services to produce antibodies as key reagents in drug discovery, and in vitro diagnostics. This includes flexible, full-cycle support for antibody commercialization, all the way from antibody development on its technology platforms, to validation, pre-clinical selection, licensing, and market access.

These partnerships have been beneficial for translational research with Abcam developing antibodies to critical biomarkers. A good example is Abcam's PD-L1 antibody which Abcam developed for a pharma company to further explore the role of PD-L1 in disease progression and treatment [7]. It was through this collaboration that Abcam could provide an antibody for use in a diagnostic assay and make it available through its catalog for basic research [8]. This type of partnership is something that Abcam will continue to develop in the future for other important targets.

To support its future growth plans and to become closer to its local science and biomedical communities, Abcam has recently signed a lease to open new headquarters in the Cambridge Biomedical Campus (CBC). The state-of-the-art building will combine the three different facilities now hosted in Cambridge Science Park under the same roof, combining the UK innovation and manufacturing capabilities, laboratories, logistics, sales, etc. and thus improve the efficiency and innovation process. The CBC is set to become a real global science hub in the heart of Cambridge and the Abcam's decision is a move toward reinforcing collaborations with the Cambridge scientific scene and establishing new ones.

Looking ahead, Abcam's mission remains the same: to serve researchers to achieve their mission, faster.



Figure 5. CGI of Abcam's new headquarters [8].

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After obtaining her B.Sc. and M.Sc. in organic chemistry from Università degli Studi di Milano (Italy), **Silvia Sonzini** moved to England where she started a PhD at Melville Laboratory for Polymer Synthesis, within the Department of Chemistry, University of Cambridge. Silvia's research focused on non-covalent interactions between a family of macrocycles and aromatic amino acids within peptides and proteins of therapeutic interest, such as amyloid beta. Silvia then moved to MedImmune as a Postdoctoral Fellow within the Formulation Sciences team. In the last two years, she developed her scientific interest in antibodies and proteins engineering and formulation, aiming towards new drug delivery routes with a focus on cancer and diabetes. Recently, Silvia joined AstraZeneca as Senior Scientist within the Advanced Drug Delivery team in the Pharmaceutical Science department. During her path, Silvia has always been interested in knowledge transfer between academic and industrial realities.



**Karolina L. Zapadka** is a Biotech Business Developer, Physical Science Consultant and Physical Chemist. Her academic work includes a double research Master diploma in Chemistry with a specialisation in Spectroscopy and Photochemistry from Jagiellonian and Lund University, a Ph.D. from University of Cambridge in Biophysics, Peptide Stability & Aggregation and Postdoctoral work between University of Cambridge and MedImmune. Karolina has a scientific background in several areas, including metabolic disorders, pharmaceutical product development, biologics stability & liquid formulations, protein self-assembly, cancer diagnostics, and polymer chemistry. For the past 8 years, she has been actively involved in Cambridge cluster, working for 2 years in the Cambridge based emerging biotech company Arecor. After industry, she went on to pursue a PhD at Chemistry Department, University of Cambridge. Karolina was funded by the Formulation Science Group in MedImmune. Working in MedImmune for more than 5 years, has given her experience in Big Pharma. Moreover, Karolina has extensive experience in valorisation of research outcomes in life science & healthcare together with business development in the private and non-profit sectors. She has lead successful high performance teams of up to 120 people in innovation in 15+ projects in several non-profit organisations. During this time, she has established, managed, and maintained a strong relationship of trust with different partners regionally, nationally, and internationally. Since early 2017 she has been Chief Executive and name partner of KLUZ Consulting, the bioinnovation business builder, which provides technical and strategy consulting services. Here, she worked on number of consulting projects for biotech companies, science parks and Business Schools.

