Students launch world's largest e-commerce platform for single stranded DNA molecules

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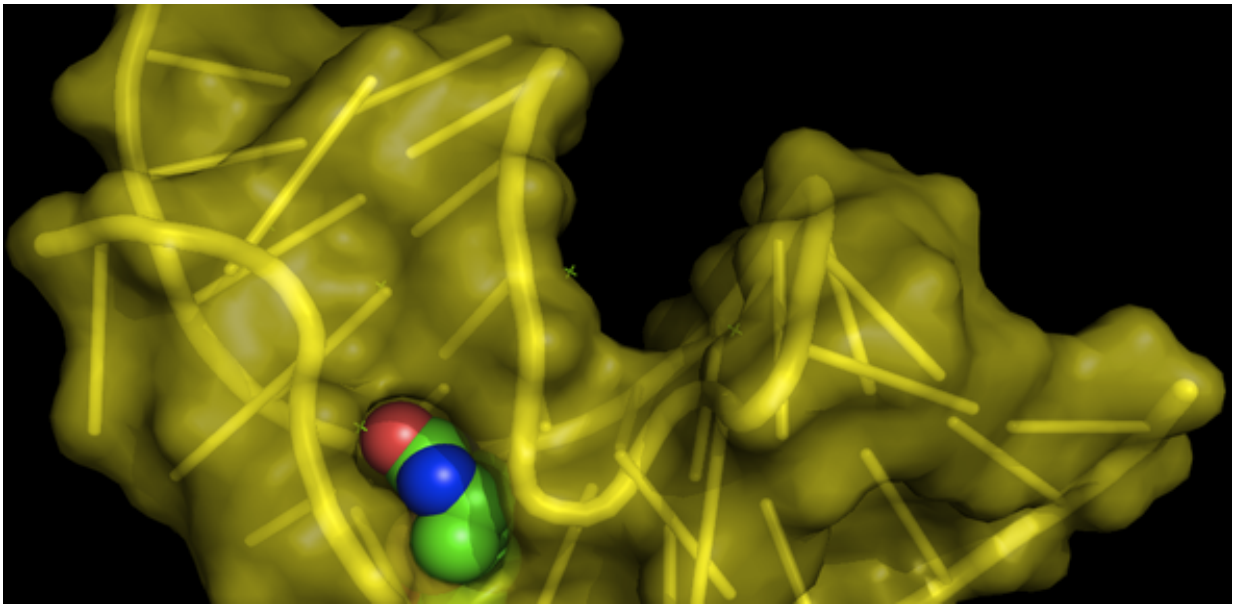

Structure of the biotin RNA aptamer (yellow) complexed with biotin - created with pymol using PBD entry 1F27. Credit: Fdardel and Wiki Commons Images

Students from the University of Cambridge have set up the world's largest e-commerce platform for single stranded DNA which they believe have enormous potential for contributing to therapeutic treatments.

Gates Cambridge Scholar Bo Shiun Lai and his labmate Yang Zhang set

up AptaCam, the world's largest oligonucleotide eCommerce platform, last year. The company was incorporated in Hong Kong late last year and in the UK last month. It has already been awarded £72,000 by the Hong Kong government and has recently been named a Top 10 innovative business idea by the Innovative Forum, which seeks to build bridges between academia industry and policy makers.

"Our e-commerce platform is about providing scientists the most up-to-date and detailed information on oligonucleotides alongside the actual physical product," says Yang. "Oligonucleotides have been widely used in facilitating discoveries in basic research, ensuring food safety, monitoring the environment, and they also play promising roles as clinical diagnostics and therapeutic agents."

Yang and Bo have been trawling through tens of thousands of papers published on oligonucleotide molecules or aptamers, single stranded DNA or RNA (ssDNA or ssRNA) molecules that can bind to pre-selected targets including proteins and peptides with high affinity and specificity. They have been uploading the DNA sequences individually to the website. The patent for aptamer technology expired two years ago, meaning it is now possible to commercialise aptamer research.

Yang, who has just finished his PhD thesis, has been expanding the database and working with Bo on funding. The company's first grant proposal was to Cyberport, which is part of the Hong Kong Cyberport Management Company. This is wholly owned by the Hong Kong Government. They awarded Bo and Yang £72,000 pounds to set up research facilities in Hong Kong as part of the growing life sciences industry there, meaning they are ideally placed to capitalise on the Chinese market.

Incorporation in the UK means they will be able to access a broader range of funding sources. As Bo is a Taiwanese and Canadian citizen, he

has been able to apply to angel investors in Taiwan. He has asked for £200,000 to spend on investing in basic laboratory facilities and technology. The company has a target of £450,000 to raise and are keen to use some of the money to educate the science community about aptamers and their potential.

Both Bo and Yang have done research on aptamers. Bo is convinced that in a few years aptamers will be used to diagnose and treat diseases. Yang's PhD project found that aptamers can recognise mutations in a single amino acid. "They can recognise the kind of subtle mutations that take place in, for instance, cancer cells and can therefore be used as diagnostic tools and to inhibit certain malfunctioning proteins, leading to new therapeutic treatments," says Bo, who is doing a PhD in Pathology. His undergraduate research on toxoplasmosis provided proof that aptamers can be used therapeutically. It resulted in him being granted a patent by the US authorities to develop a treatment for toxoplasmosis.

Currently the best way to recognise malfunctioning proteins is through the use of antibodies, but Bo says aptamers can supplement what antibodies do at a fraction of the cost. Moreover, they don't degrade over time in the same way antibodies do and are more flexible, smaller and more versatile than antibodies so they can deliver treatments directly into cells. Bo says: "They are useful because they can fold into all kinds of shapes. They are stable, and can easily be chemically modified (put a fluorescent tag on them, for example)."

Bo and Yang spent much of last year creating the website platform, which currently has 6,000 searchable sequences on it. For researchers looking for sequences not on the database, the company also has an oligo discover programme that can customise sequences for the researcher's intended targets. The plan now is to expand the infinite number of aptamer sequences that are available to scientists.

As it has grown, AptaCam has been supported by a new business research partnership. It is one of the first companies to take part in the Accelerate Cambridge Life Sciences programme, a collaborative effort between AstraZeneca and Cambridge Judge Business School and provides expert advice and mentoring on branding, marketing and raising financial capital.

Provided by University of Cambridge