Researchers are using an innovative synthetic biology approach to produce entirely new peptide-based materials. The new technology, called Zentide, uses bacteria to produce peptides. Zentide’s unique selling point is its ability to build peptides without the limitations of chemical methods, meaning researchers can produce difficult peptides at a lower economic and environmental cost.

Zentide was engineered by researchers from BrisSynBio, the University of Bristol’s Synthetic Biology Research Centre, using Industrial Biotechnology Catalyst funding from BBSRC and Innovate UK. Early products included an adhesive peptide for the Defence Science and Technology Laboratory, and the team are now creating surgical and dressing adhesives for healthcare.

Further BBSRC funding supported commercialisation of the technology, leading to the establishment of spin-out company Zentraxa in 2017. Zentraxa have since secured a total of £500,000 private investment.

**Impact Summary**

Researchers are using an innovative synthetic biology approach to produce entirely new peptide-based materials.

The new technology, called Zentide, uses bacteria to produce peptides. Zentide’s unique selling point is its ability to build peptides without the limitations of chemical methods, meaning researchers can produce difficult peptides at a lower economic and environmental cost.

Zentide was engineered by researchers from BrisSynBio, the University of Bristol’s Synthetic Biology Research Centre, using Industrial Biotechnology Catalyst funding from BBSRC and Innovate UK. Early products included an adhesive peptide for the Defence Science and Technology Laboratory, and the team are now creating surgical and dressing adhesives for healthcare.

Further BBSRC funding supported commercialisation of the technology, leading to the establishment of spin-out company Zentraxa in 2017. Zentraxa have since secured a total of £500,000 private investment.
and also at lower cost, meaning that there'll be new markets for peptides," explains Dr Martin Challand, co-founder and Chief Technical Officer at Zentraxa.

After seeing positive results in the lab, the team considered Zentide's potential applications. They drew inspiration from marine mussels' ability to produce sticky proteins to adhere themselves to rocks, and explored the potential to recreate that biological adhesion in industry. Dr Challand says, "We developed a portfolio of our own novel peptides inspired by the marine mussel protein, but which perform better as adhesives in real-world applications. These peptides would have been very challenging to synthesise using any other technique or technology. So we're now looking for specific market opportunities where these peptides can offer improvements to adhesion not achievable with traditional adhesive components."

One of the first projects to demonstrate Zentide's potential was the creation of a novel transparent, waterproof adhesive for the Defence Science and Technology Laboratory (Dstl) to use in defence applications. But Dr Race says "it's not just about producing a tube of glue, we can also incorporate these sticky peptides into other preparations." The team are exploring other possibilities such as surgical and dressing adhesives for use in healthcare. The wider applications for the peptide-based adhesives include coatings, inks and sealants.

Thanks to successful preliminary contracts, such as the one with Dstl, the team entered the multi-million pound peptides market to commercialise the technology and develop it to its full potential. Further BBSRC funding in the form of an Impact Acceleration Account and a £12,000 Follow-on Fund Pathfinder grant allowed them to employ a business consultant and develop a business plan, supporting the commercialisation of Zentide and the establishment of spin-out company Zentraxa in 2017.

"The fundamental research was funded by BBSRC, so without that there would be no Zentide, no Zentraxa," says Dr Challand. "Without that BBSRC investment, this wouldn't have happened," adds Dr Race.

Finding investment

Dr Challand, who helped develop Zentide as a postdoctoral researcher, is now Chief Technology Officer at Zentraxa. His move was supported by a BBSRC Flexible Talent Mobility Account (FTMA) awarded to the University of Bristol. This financed an initial five-month secondment at Zentraxa, during which Martin worked on Zentraxa's business development and securing private investment.

"The FTMA gave me time to really focus on Zentraxa, get into the role of Chief Technology Officer, and focus on the business development," says Dr Challand. "Doing that has been really critical to give me that chance to develop new skills and a new network in a commercial centre, and that's meant that we've been able to secure investment into Zentraxa."

Zentraxa now operate from Bristol-based incubator Unit DX, and have secured support through the facility's local investor network. Other investors include Bristol Private Equity Club and the UK Innovation and Science Seed Fund (UKI2S), with investments totalling £500,000. This will allow them to expand their employee base, secure more contracts and refine the technology.

REFERENCES

1 https://zentraxa.com/
2 http://www.bristol.ac.uk/brissynbio/
3 https://www.marketsandmarkets.com/PressReleases/peptide-synthesis.asp
4 http://www.peptidesguide.com/peptides-application.html
5 https://gtr.ukri.org/projects?ref=BB%2FM028186%2F1
6 https://gtr.ukri.org/projects?ref=131840
7 https://www.bristol.ac.uk/red/industry/bbsrc-iaa-15/
8 https://gtr.ukri.org/projects?ref=BB%2FP022839%2F1
9 https://gtr.ukri.org/projects?ref=BB%2FS507891%2F1
10 https://unitdx.com/