



Development of Disruptive Peptide Anti-Cancer Drug Candidates

Targeting the structures of proteins involved in cancer progression with disruptive peptides; a novel approach to cancer therapeutics.

Cancer is one of the leading causes of morbidity and mortality worldwide. In China, some 3 million people died from cancer-related illness in 2015. It is now estimated that there are 12,000 new cancer diagnoses each day, and cancer rates are expected to increase in the future. Current cancer therapies can be invasive (surgery) or produce severe side effects such as anaemia and immunodeficiency. Resistance to current cancer chemotherapeutics is common, so there is a clear need for additional cancer therapies that have fewer side effects.

Peptide-based drugs are emerging as the treatment of choice for a variety of indications due to their high selectivity, efficacy and safety. Their success rate in clinical trials is twice that of small molecule drugs. Researchers at the Institute for Glycomics have now developed novel **disruptive peptides that target proteins integral to processes involved in cancer progression and metastasis.**

The Technology

The structural configuration of proteins dictates their ability to carry out functions within the human body. To develop disruptive peptides, computational modelling is used to identify specific amino acid sequences integral to the overall protein structure.

Complex algorithms are used to design a disruptive peptide specific for a single protein target. The disruptive peptide impedes the natural folding of the protein, thereby preventing it from functioning.

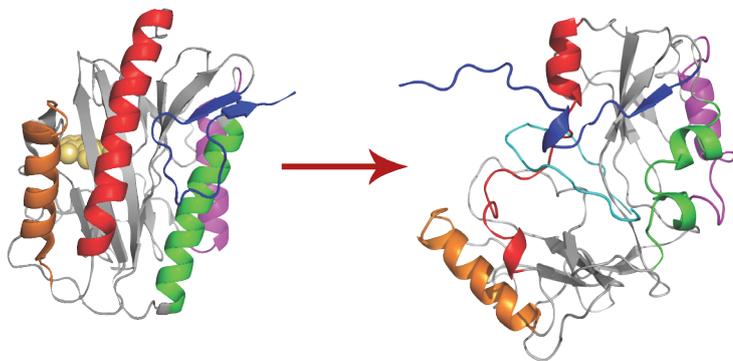
Using our Disruptive Peptide Design Platform, we have already developed peptides for important oncogenic proteins such as MetAP2. MetAP2, plays a key role in angiogenesis and inhibition of this protein has been shown to block pivotal angiogenesis pathways. We have experimentally shown *in vitro* that our disruptive peptide can halt the usual migration and growth of tumour cells.

Peptide Oncology Market

The peptide drug market is experiencing huge growth and peptide oncology drugs have proven to be excellent sellers. For example leuprorelin (for prostate and ovarian cancer) has achieved blockbuster status with annual sales over US\$1 billion.

More specifically, there are three blockbuster angiogenesis drugs, including bevacizumab, which had 2015 sales of US\$6.95 billion. With the potential for reduced drug resistance and side effects, we predict that an anti-angiogenesis disruptive peptide will be well placed to take a significant portion of the angiogenesis market.

Fighting diseases of global impact



A functional protein (left) is neatly arranged to accommodate the natural ligand (yellow circles). A disruptive peptide causes unnatural folding of the protein (right) which is therefore unable to function.

Competitive Advantage

Disrupting the functions of disease-causing proteins is a common method for drug discovery. Instead of targeting protein function directly, the unique aspect of our approach is to target the structure, the foundation of the function. Destroying the foundation of the function will be less likely to develop resistance by cancer through mutation.

The Institute's Disruptive Peptide Design Platform has several additional advantages over other drug discovery approaches, including a high lead identification hit rate and the ability to generate highly specific leads with the potential for low off-target effects. The computational design model reduces testing and experimental costs as much of the early lead development work is conducted using computer software.

Technology Development Status

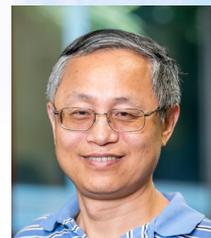
Our Disruptive Peptide Design Platform and lead candidate development program is now ready for co-development and licensing. We have generated extensive proof of concept data for several tumour protein targets, including MetAP2. We are now computationally identifying and optimising disruptive peptides for other important proteins involved in cancer disease states. Peptide preparation is outsourced with subsequent *in vitro* efficacy studies performed both in-house and out-sourced. Preclinical studies determining efficacy and toxicology in animal models will be undertaken on lead disruptive peptides, with the view to generating comprehensive data packages for subsequent first-in-man trials.

Opportunity for Partnership

We are now seeking partners to co-develop and license this technology for the oncology market.

RESEARCH LEADER

Professor Yaoqi Zhou is recognized as a world-leader in computational biology and structural bioinformatics. Prof. Zhou has a proven track record in commercialisation of his technologies and is the author of over 180 peer reviewed journal articles. Prof. Zhou leads an experienced and innovative team of researchers determined to quickly translate computational designs into therapeutic drugs.



ABOUT US

The Institute for Glycomics is a flagship biomedical research institute at Griffith University's Gold Coast Campus in Queensland, Australia. The Institute is one of only six of its kind worldwide and has a strategic focus on translating drug and vaccine discovery research into clinical outcomes. We have a strong track record in commercialisation and industry engagement, and our research leaders and business personnel have extensive experience in developing technologies for the commercial market. With over 230 multidisciplinary researchers and support staff, the Institute for Glycomics is well positioned to deliver tangible clinical solutions for infectious diseases and cancer.

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