Name Yue (May) Wu
Address Demerec Lab 120, 1 Bungtown Road, Cold Spring Harbor, NY
Mobile 516-348-3004
Email ywu@cshl.edu

EDUCATION

- **2016 – 2020 Ph.D. in the Institute for Molecular Bioscience**
  The University of Queensland, Brisbane, Australia

Award Conferred: Doctor of Philosophy - **11 May 2020**
Thesis Title: *E. coli* Cell-Free Platform for Production of Complex Peptides and Proteins

Projects:
In vitro platform for production of peptides/proteins with intramolecular bonds and unnatural amino acids in cell-free system

- **2011 – 2014 Master of Pharmaceutical Chemistry**
  Sun Yat-sen University, Guangzhou, China

Project:
Study of the screening and interaction mechanism between small molecular ligands and G-quadruplex structure in human *VEGF* promoter and mRNA regulatory region.

- **2007 – 2011 Bachelor of Bioengineering**
  Hua-zhong Agricultural University, Wuhan, China

Projects:
1. Expression and functional analysis of *sulfolobus solfataricus P2* Strain sso-0660 gene in *Sulfolobus islandicus E234* Strain;
2. Isolation of soil microbial and identification of antibiotics related gene functions.

SKILLS SUMMARY

- **Professional Skills:**
  In vitro: Gene cloning, Site-directed mutagenesis, (complex) Peptide and protein expression in cell-free system, *In vitro* transcription/translation, Protein expression and purification (AKTA Xpress and AKTA PURE systems), PCR, RT-qPCR, Circular dichroism (CD), Microscale thermophoresis (MST), Isothermal Titration Calorimetry (ITC), Surface Plasmon Resonance (SPR), Fluorescence Resonance Energy Transfer (FRET), RNA interference, Western blot, LC-MS, Electrophoretic Mobility Shift Assay (EMSA), Pull-down assay, Flow cytometry, Dual-Luciferase reporter assay, ELISA assay, Confocal Microscopy, etc.
  In cells & In vivo: Mammalian tumour cell culture of established cell lines, *In-vitro* based functional assays (proliferation, adhesion, migration, invasion), Real-Time Cellular Analysis (RTCA), Angiogenesis test in chick chorioallantoic membrane, Breast cancer mice model, etc.
- **Technical Proficiency:** Microsoft Office (including Word, Excel, PowerPoint), Prism, Snap Gene, Endnote, Corel draw, Adobe Illustrator, Adobe Photoshop, Image J, etc.
- **Communicational and Organisation Skills:** Ability to multi-tasking and proactive, hands-on attitude; demonstrated ability to meet deadlines and objectives; good organisational and record keeping skills; ability to work with independence and as a part of a team; ability to generate high quality and reproducible data for publications and presentations.

PUBLICATIONS

1. **Wu, Y.**; Cui, Z.; Huang, Y.; Veer, S.; Arelov, AV.; Guo, Z.; Moradi, SV.; Hinton, A.; Deuis, JR.; Guo S.; Chen, K.; Collins, BM.; Vetter, I.; Herzig, V.; Jones A.; Cooper MA.; King GF.; Craik, DJ.; Alexandrov, K.; Mureev, S., A generic approach to production and folding of therapeutically-relevant peptides and proteins in a cell-free translation system. *Nature Biotechnology*, 2020, (under review).

2. Cui, Z.; **Wu, Y.**; Mureev, S.; Alexandrov, K., Oligonucleotide-mediated tRNA sequestration enables one-pot sense codon reassignment *in vitro*. *Nucleic Acids Research*, 2018, 46 (12), 6387-6400.
doi: 10.1093/nar/gky365

3. Wang, S. K.; **Wu, Y.**; Wang, X. Q.; Kuang, G. T.; Zhang, Q.; Lin, S. L.; Liu, H. Y.; Tan, J. H.; Huang, Z. S.; Ou, T. M., Discovery of Small Molecules for Repressing Cap-Independent Translation of Human Vascular Endothelial Growth Factor (hVEGF) as Novel Antitumor Agents. *Journal of Medicinal Chemistry*, 2017, 60 (13), 5306-5319. doi: 10.1021/acs.jmedchem.6b01444

4. Liu, H. Y.; Zhao, Q.; Zhang, T. P.; **Wu, Y.**; Xiong, Y. X.; Wang, S. K.; Ge, Y. L.; He, J. H.; Lv, P.; Ou, T. M.; Tan, J. H.; Li, D.; Gu, L. Q.; Ren, J.; Zhao, Y.; Huang, Z. S., Conformation selective antibody enables genome profiling and leads to discovery of parallel G-quadruplex in human telomeres. *Cell Chemical Biology*, 2016, 23 (10), 1261-1270.
doi: 10.1016/j.chembiol.2016.08.013

5. Wang, S. K.; **Wu, Y.**; Ou, T. M., RNA G-quadruplex: the new potential targets for therapy. *Current Topics in Medicinal Chemistry*, 2015, 15 (19), 1947-1956.
doi: 10.2174/1568026615666150515145733

6. **Wu, Y.**; Zan, L. P.; Wang, X. D.; Lu, Y. J.; Ou, T. M.; Lin, J.; Huang, Z. S.; Gu, L. Q., Stabilization of VEGF G-quadruplex and inhibition of angiogenesis by quindoline derivatives. *Biochimica et Biophysica Acta - General Subjects*, 2014, 1840 (9), 2970-2977.
doi: 10.1016/j.bbagen.2014.06.002

CONFERENCES

1. The 4th International Conference on Circular Proteins and Peptides (ICCPP), Kawasaki (Japan), Nov 2018

2. The 3rd International Conference on Proteins & Peptides, Structure, Function and Biotechnology, Geneva (Switzerland), July 2018

3. The 8th National Conference on Chemical Biology, Shanghai (China), Sep 2013

WORK EXPERIENCE

- **Research Assistant**, Sun Yat-sen University, 2013 – 2015

Duties: Responsible for communicating and demonstrating practical lab work to undergraduates and help them for research competition as a leader.
Achievements: Guiding undergraduates won the second prize in the Undergraduate Research Design Contest.

- **Research Assistant**, Queensland University of Technology, 2020 – 2021

Duties: Experiments designing, performing and analysis; routine laboratory maintenance; present and publish research findings as required.
Achievements: Completed the project and published papers at the end of my work.

SUMMARY OF PRIOR RESEARCH

During my Ph.D. period, I have been working in the field of synthetic biology and focused on development of generic cell-free platform for production of complex therapeutically-relevant polypeptides. Since a majority of proteins and disulfide-rich peptides display complex folding kinetics and rely on concerted chaperone assistance *in vivo*, accommodation of each unique folding landscape *in vitro* generally requires case-by-case optimization of multiple system parameters to obtain active therapeutics with sufficient yield. Therefore, the objective of my research was to develop a generally applicable *in vitro* approach for production of complex therapeutically-relevant peptides and proteins. In the course my doctoral studies, I established an affinity resin-assisted *in vitro* translation system which enables aggregation-free environment for oxidative folding and/or recycling of misfolded intermediates under thermodynamic control. This approach can be also combined with the simultaneous reassignment of two sense-codons to bio-orthogonal reactive amino acids for the production of macrocyclic peptides. To the best of our knowledge, this was the first study reporting peptides comprising cyclized or open backbones with non-canonical amino acids produced in the crude *E. coli*-based translation system without the use of a protein carrier. Differences in chaperone machineries between pro- and eukaryotes were found to affect the efficacy of prolyl bond isomerization, which makes a significant contribution to poor folding of proteins harbouring cis-Pro bonds in the prokaryotic system. Finally, we demonstrated that our approach can be used to produce a wide range of disulfide-rich peptides and antibody fragments in amounts sufficient for interaction analysis and biological activity assessment. This platform stands out in its simplicity and can be of major interest for broad biotechnology and pharmaceutical research offering solutions to major bottlenecks of cell-free translation: protection of translation products from degradation and aggregation, control over their folding, introduction of noncanonical modalities and facile purification.

My master project focused on the high-throughput screening of anti-breast cancer small molecules and their bioactivity tests *in vitro* and *in vivo*. In many types of cancer, vascular endothelial growth factor (VEGF) is overexpressed and is generally associated with tumor progression and survival rate. Effective ligands can stabilize the secondary structure (G-quadruplex) in the VEGF promoter region or repress the G-quadruplex in 5'-UTR of VEGF mRNA to hinder its expression. Our findings have significance not only for understanding the mechanism of the G-quadruplex ligands mediating the VEGF transcription or translation inhibition, but also for exploring a new anti-tumor strategy to block VEGF expression in order to inhibit the angiogenesis in cancer cells.

REFEREES

Referees can be provided upon request.