YI-PIN CHANG

A meticulous Ph.D. enjoys working at the interface between Chemistry and Biology

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SUMMARY & SKILLS

Protein and Peptide Chemistry

- Automated and manual solid-phase synthesis of peptides, peptidomimetics, cyclic peptides and combinatorial peptide libraries through Fmoc or Boc chemistry (*vide infra* publications #2-6, 9-10, 12, 13 and 15).
- Protein purification (publications #9 and 12)
- Molecular modeling (publications #1, 2, 5, 9 and 13)

Assay Development

- Surface plasmon resonance (publications #8, 9, 11, 13 and 15)
- Gel electrophoresis (publications #2, 5, 9 and 12)
- High-performance liquid chromatography (publications #1)
- Cell-based assays (publications #1, 3 and 4)
- Histochemical analysis (publications #1)
- Liquid chromatography–mass spectrometry

Highlights

- A mannosidase inhibitor was identified from an iminosugar library by HPLC, cell-based and histochemical assays that capable of reproduce a human disease in guinea pigs (publication #1).
- The most selective and potent antagonist of a nicotinic acetylcholine receptor was discovered from a positional scanning library (> 100 million compounds) by cell-based assays (publication #3).
- The most potent inhibitor of antitrypsin aggregation was identified from a split-and-mix library by a unique conformation-sensitive gel electrophoresis, which has been used to validate the disease mechanism (publication #5 and 9).
- The binding kinetics and thermodynamics between VanX and peptidemimetics (the molecular weight was the detection limit) were revealed by surface plasmon resonance (publication #13).
- The binding affinity of a streptavidin-binding peptides was enhanced 1000-fold by cyclization and their equilibrium dissociation constants were determined by surface plasmon resonance (publication #15).

EDUCATION & PROFESSIONAL

Postdoctoral Research Fellow (Proteomics) 2014-present
The Forsyth Institute (Harvard Medical School affiliate), Cambridge, USA

Consultant (Peptide Drug Development) 2014-present
TaiPhar Management & Consulting Corp, Hsinchu, Taiwan

Postdoctoral Research Fellow (Peptide Drug Discovery) 2012-2013
Torrey Pines Institute for Molecular Studies, Port St. Lucie, USA

Postdoctoral Research Assistant (Glycobiology) 2008-2011
University of Oxford, Oxford, UK

Ph.D. in Chemistry and Biochemistry 2001-2007
National Chung Cheng University, Chiayi, Taiwan

Ph.D. Graduate Research Assistant (Bioorganic Chemistry) 2003-2007
National Chung Cheng University, Chiayi, Taiwan

M.S. in Applied Chemistry 1999-2001
Chinese Culture University, Taipei, Taiwan

M.S. Graduate Research Assistant (Natural Product Chemistry) 1999-2001
National Research Institute of Chinese Medicine, Taipei, Taiwan

B.Eng. in Chemical Engineering 1994-1999
Feng Chia University, Taichung, Taiwan

EDITORIAL & SOCIETIES

Editorial Board 2013-present
Journal of Liver and Clinical Research
Hereditary Genetics: Current Research
Journal of Research and Development

Member 2012-present
American Peptide Society
European Peptide Society
American Chemical Society

UNIVERSITY SERVICES & EXTRACURRICULAR ACTIVITIES

Safety Committee 2014-present
The Forsyth Institute (Harvard Medical School affiliate), Cambridge, USA

Team Manager and Coach for Eastern Collegiate Taekwondo Conference 2014-present
Harvard University Taekwondo Club, Cambridge, USA

Oxford Blue (Varsity Team) 2010-2011
Oxford University Taekwondo Club, Oxford, UK

Teaching Assistant for Undergraduate (Organic Chemistry LAB I & II) 2004-2005
National Chung Cheng University, Chiayi, Taiwan

Teaching Assistant for Undergraduate (Instrumental Analysis) 2001-2002
Chinese Culture University, Taipei, Taiwan

President 1995-1997
Feng Chia University Taekwondo Club, Taichung, Taiwan

Publicity for the Student Association 1995-1996
Feng Chia University, Taichung, Taiwan

HONORS & AWARDS

Young Peptide Scientist Award 2012/07/04
12th International Chinese Peptide Symposium, Shenyang, China

Travel Grant Award 2010/12/04
5th International Peptide Symposium, Kyoto, Japan

Finalist of European Young Chemist Award 2010/08/29
3rd EuCheMS Chemistry Congress, Nuremberg, Germany

Service Award 2008/08/01
Ministry of National Defense, Kaohsiung, Taiwan

Excellent Dissertation Award in Analytical Chemistry 2007/12/16
Annual Meeting of Chinese Chemical Society Located in Taipei, Hsinchu, Taiwan

Best Poster Award & Travel Grant Award 2006/09/08
29th European Peptide Symposium, Gdańsk, Poland

Best Poster Award 2005/11/20
Annual Meeting of Chinese Chemical Society Located in Taipei, Kaohsiung, Taiwan

Valedictorian 2001/06/08
Chinese Culture University, Taipei, Taiwan

Outstanding Student Award 2001/06/08
Chinese Culture University, Taipei, Taiwan

CONFERENCE TALKS

Discovery of a selective lysosomal α-mannosidase inhibitor from an imino-sugar library 2014/09/02

33rd European Peptide Symposium, Sofia, Bulgaria

Blocking formation of large protein aggregates by small peptides 2012/07/04

12th International Chinese Peptide Symposium, Shenyang, China

Combinatorially selected 4-mer peptide probes inhibit the pathogenic polymerization of α_1-antitrypsin 2010/12/04

5th International Peptide Symposium, Kyoto, Japan

Inhibiting the pathogenic polymerization of protein: Combinatorial chemistry in combating antitrypsin-related liver and lung diseases 2010/08/31

3rd EuCheMS Chemistry Congress, Nürnberg, Germany

Combinatorial search for anti-protein aggregation ligands, streptavidin-binding cyclopeptides, and cell cycle inhibitors 2005/11/20

Annual Meeting of Chinese Chemical Society Located in Taipei, Kaohsiung, Taiwan

PUBLICATIONS

1. **Chang, Y. -P.**; Muckeen, M.; Alonzi, D. S.; Sagar, R.; Dickens, A. M.; Chapman, T. M.; Butters, T. D.; Anthony, D. C.; Davis B. G. A selective lysosomal carbohydrate mimetic induces a chemical model of congenital disease. *Nat. Chem. Biol.* **2015**, to be submitted.

2. **Chang, Y. -P.**; Chu, Y. -H. Mixture-based combinatorial libraries from small individual peptide libraries: A paradigm for a conformational disease. *Molecules* **2014**, *19*, 6330-6348. (IF: 2.095; 70/172 in Organic Chemistry)

3. **Chang, Y. -P.**; Banerjee, J.; Christensen, S.; Wu, J.; Gyanda, R.; Houghten, R. A.; Toll, L.; McIntosh, J. M.; Armishaw, C. J. Discovery of potent and selective α3β4 nicotinic acetylcholine receptor antagonists from a α4/4-conotoxin mixture based synthetic combinatorial library. *J. Med. Chem.* **2014**, *57*, 3511-3521. (IF: 5.480; 7/169 in Drug Discovery)

4. Banerjee, J.; Yongye, A. B.; **Chang, Y. -P.**; Gyanda, R.; Medina-Franco, J. L.; Armishaw, C. J. Design and synthesis of α-conotoxin GID analogues as selective α4β2 nicotinic acetylcholine receptor antagonists. *Biopolymers* **2013**, *102*, 78-87. (IF: 2.288; 40/172 in Organic Chemistry)

5. **Chang, Y. -P.**; Chu, Y. -H. Blocking formation of large protein aggregates by small peptides. *Chem. Commun.* **2013**, *49*, 4591-4600. (IF: 6.718; 17/417 in Chemistry)

6. Gyanda, R.; Banerjee, J.; **Chang, Y. -P.**; Phillips, A. M.; Toll, M.; Armishaw, C. J. Oxidative folding and preparation of α-conotoxins for use in high-throughput structure-activity relationship studies. *J. Pept. Sci.* **2013**, *19*, 16-24. (IF: 1.862; 159/346 in Pharmacology)

7. Cheng, C. I.; **Chang, Y. -P.**; Chu, Y. -H. Biomolecular interactions and tools for their recognition: focus on the quartz crystal microbalance and its diverse surface chemistries and applications. *Chem. Soc. Rev.* **2012**, *41*, 1947-1971. (IF: 30.425; 3/417 in Chemistry)

8. **Chang, Y. -P.**; Mahadeva, R., Patschull, A. O. M.; Nobeli, I.; Ekeowa, U. I.; McKay, A. R.; Thalassinos, K.; Irving, J. A.; Haque, I. U.; Nyon, M. P.; Christodoulou, J.; Gonzalez, A.; Miranda, E.; Gooptu, B. Targeting serpins in high-throughput and structure-based drug design. *Method. Enzymol.* **2011**, *501*, 139-175. (IF: 1.626; 85/390 in Biochemistry)

9. **Chang, Y. -P.**; Mahadeva. R.; Chang, W. -S. W.; Lin, S. -C.; Chu, Y. -H. Small-molecule peptides inhibit Z α_1-antitrypsin polymerization. *J. Cell. Mol. Med.* **2009**, *13*, 2304-2316. (IF: 3.698; 33/166 in Molecular Medicine)

10. Tseng, M. -C.; **Chang, Y. -P.**; Chu, Y. -H. Quantitative measurements of vancomycin binding to self-assembled peptide monolayers on chips by quartz crystal microbalance D-Ala-D-Ala. *Anal. Biochem.* **2007**, *371*, 1-9. (IF: 2.749; 182/390 in Biochemistry)

11. **Chang, Y. -P.**; Tseng, M. -C.; Chu, Y. -H. Emerging biosensor-based technology in the field of drug discovery. *Instruments Today* **2007**, *156*, 56-67.

12. **Chang, Y. -P.**; Mahadeva. R.; Chang, W. -S. W.; Shukla, A.; Dafforn, T.; Chu, Y. -H. Identification of a 4-mer peptide inhibitor that effectively blocks the polymerization of pathogenic Z α_1-antitrypsin. *Am. J. Respir. Cell Mol. Biol.* **2006**, *35*, 540-548. (IF: 2.749; 9/130 in Pulmonary and Respiratory Medicine)

13. **Chang, Y. -P.**; Tseng. M. -J.; Chu, Y. -H. Using surface plasmon resonance to directly measure slow binding of low-molecular mass inhibitors to a VanX chip. *Anal. Biochem.* **2006**, *359*, 63-71. (IF: 2.749; 182/390 in Biochemistry)

14. **Chang, Y. -P.**; Chang, W. -S. W.; Chu, Y. -H. α_1-Antitrypsin deficiency and the conformational diseases. C*hemistry*. **2005**, *63*, 419-430.

15. **Chang, Y. -P.**; Chu, Y. -H. Using surface plasmon resonance to directly determine binding affinities of combinatorially selected cyclopeptides and their linear analogs to a streptavidin chip. *Anal. Biochem.* **2005**, *340*, 74-79. (IF: 2.749; 182/390 in Biochemistry)

BOOK CHAPTERS

Banerjee, J.; Gyanda, R.; **Chang, Y. -P.**; Armishaw, C. J. In *The chemical synthesis of α-conotoxins and structurally modified analogs with enhanced biological stability*; Cudic, P., Ed.; Peptide modifications to increase metabolic stability and activity; Humana Press Inc.: New York, USA, **2013**, pp 13-34.

Chang, Y. -P. In *Inhibiting pathogenic protein aggregation: Combinatorial chemistry in combating alpha-1 antitrypsin deficiency*; Pignataro, B., Ed.; New strategies in chemical synthesis and catalysis; Wiley-VCH Verlag GmbH: Weinheim, Germany, **2012**, pp 299-323.

REFERENCES

Prof. Terry D. Butters (e-mail: terry.butters@bioch.ox.ac.uk)

Oxford Glycobiology Institute, University of Oxford, Oxford, UK

Dr. Ravi Mahadeva (e-mail: rm232@cam.ac.uk)

Department of Medicine, University of Cambridge, Cambridge, UK

Prof. Yen-Ho Chu (e-mail: cheyhc@ccu.edu.tw)

Department of Chemistry and Biochemistry, National Chung Cheng University, Chiayi, Taiwan