

Victor J. Hruby - Science Education / Courses

Course Descriptions:

Chemistry 436/536: Scientific and Ethical Aspects of Modifying Human Behavior

Since the dawn of human existence and the emergence of intellectual discourse and culture, the origins and mystery of human behavior have challenged humans. Efforts to control human behavior seem to be universal, and have involved defining and enforcing norms of behavior that can be tribal, social, legal, political, religious and/or philosophical in their origins and implications. Though “chemicals” have been used to modify human behavior since time immemorial, efforts to utilize science to do so are of a more recent origin. What are the implications of using science to modify human behavior, for society, for medicine? How does this science intersect with previous efforts to modify or control human beings? If we are to “improve” humans, what does improve mean? If we are to change human behavior, who is to decide? We will attempt to address these and other issues. In this course, it is expected that you become familiar with these and other questions from scientific, ethical, cultural and other perspectives and be prepared to discuss them.

Independent Research/Study

Dr. Hruby also offers independent research opportunities in his lab for students. Please see below for details on what research opportunities are available.

Major Areas of Research Interest:

Peptide Hormones and Neurotransmitters, Chemistry, Biophysics, Pharmacology, Physiology & Medical, Pain, Tolerance, Addiction, Obesity, Anorexia, Sexual Function, Pigmentation, Inflammation

Student Research Opportunities:

- Studies on the design, synthesis and pharmacological evaluation of novel, multivalent ligands for the treatment of prolonged and neuropathic pain without toxicities or the developing of tolerance.
- Studies of the synthesis of multivalent ligands with reporter groups and/or drugs for the detection and/or treatment of cancer
- Development of melanotropin hormone and neurotransmitter analogues with biological activity profiles for the treatment of feeding disorders, pigmentary disorders, sexual disorders, pain, and immune or inflammatory responses

Selected Publications With Student Co-Authors (Numbers from [Publications](#) ^[1]):

1005. I.D. Alves, Z. Salamon, E. Varga, H.I. Yamamura, G. Tollin, and V.J. Hruby. Direct Observation of G-Protein Binding to the Human μ -Opioid Receptor Using Plasmon-Waveguide Resonance Spectroscopy. *J. Biol. Chem.*, **278**, 48890-48897 (2003).
1019. M. Cai, M. Stankova, S. J.K. Pond, A.V. Mayorov, J.W. Perry, H.I. Yamamura, D. Trivedi, and V.J. Hruby. Real Time Differentiation of G-Protein Coupled Receptor (GPCR) Agonist and Antagonist by Two Photon Fluorescence Laser Microscopy. *J. Am. Chem. Soc.*, **126**, 7160-7161 (2004).
1034. M. Cai, A.V. Mayorov, C. Cabello, M. Stankova, D. Trivedi, and V.J. Hruby. Novel 3D Pharmacophore of μ -MSH/ μ -MSH Hybrids Leads to Selective Human MC1R and MC3R Analogues. *J. Med. Chem.*, **48**, 1839-1848 (2005).
1090. J.P. Cain, A.V. Mayorov, M. Cai, H. Wang, B. Tan, K. Chandler, Y.S. Lee, R.R. Petrov, D. Trivedi, and V.J. Hruby. Design, Synthesis, and Biological Evaluation of a New Class of Small Molecule Peptide Mimetics Targeting the Melanocortin Receptors. *Bioorg. Med. Chem. Letts.*, **16**, 5462-5467 (2006). PMC1810397
1118. V.J. Hruby, M. Cai, J.P. Cain, A.V. Mayorov, M.M. Dedek, and D. Trivedi. Design, Synthesis and Biological Evaluation of Ligands Selective for the Melanocortin-3 Receptor. *Current Topics Med. Chem.*, **7**, 1085-1097 (2007). PMC2274922
1139. A.V. Mayorov, M. Cai, E.S. Palmer, M.M. Dedek, J.P. Cain, A.R. Van Scoy, B. Tan, J. Vagner, D. Trivedi, and V.J. Hruby. Structure-Activity Relationships of Cyclic Lactam Analogues of μ -Melanocyte-Stimulating Hormone (μ -MSH) Targeting the Human Melanocortin-3 Receptor. *J. Med. Chem.*, **51**, 187-195 (2008). PMC2587288
1150. Y.S. Lee, R.S. Agnes, J.P. Cain, V. Kulkarni, M. Cai, C. Salibay, K. Ciano, R. Petrov, A. Mayorov, J. Vagner, D. Trivedi, P. Davis, S-W. Ma, J. Lai, F. Porreca, R. Vardanyan, and V.J. Hruby. Opioid and Melanocortin Receptors: Do They Have Overlapping Pharmacophores? *Peptide Science*, **90**, 433-438 (2007). PMC2693099
1196. L. Doedens, F. Opperer, M. Cai, J.G. Beck, M. Dedek, E. Palmer, V.J. Hruby, and H. Kessler Multiple *N*-Methylation of MT-II Backbone Amide Bonds Leads to Melanocortin Receptor Subtype hMC1R Selectivity: Pharmacological and Conformational Studies *J. Amer. Chem. Soc.*, **132**, 8115-8128 (2010). NIHMSID 208710.
1199. D. Torino, A. Mollica, F. Pinnen, F. Feliciani, G. Lucente, G. Fabrizi, G. Portalone, P. Davis, J. Lai, S-W. Ma, F. Porreca, and V.J. Hruby Synthesis and Evaluation of New Endomorphin-2 Analogues Containing (*Z*)- μ - μ -Didehydrophenylalanine (μ -Phe) Residues. *J. Med. Chem.* **53** (11), 4550-4554 (2010).
1222. J.S. Josan, H.L. Handl, R. Sankaranarayanan, L. Xu, R.M. Lynch, J. Vagner, E.A. Mash, V.J. Hruby and R.J. Gillies. Cell Specific Targeting by Heterovalent Ligands. *Bioconjugate Chemistry*, **22**, 1270-1278 (2011).

[Research Group](#)^[2]

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