BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Carrie Haskell-Luevano	Associate Professor of Medicinal Chemistry
eRA COMMONS USER NAME CHASKELL_LUEVANO	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Calif. State Univ. Fresno, Fresno, CA	BS	1990	Chemistry
University of Arizona, Tucson, AZ	Ph.D.	1995	Chemistry
University of Michigan, Ann Arbor, MI	Postdoc	1995-1996	Molecular Biology
Vollum Institute, OR Health Sci. Univ. Portland, OR	Postdoc	1996-1998	MolBio/Neuroscience

Professional Experience

1990-1995 Graduate Student, Department of Chemistry, University of Arizona (mentor: Victor J. Hruby)
1995-1996 Postdoctoral Fellow, Department of Internal Medicine, University of Michigan (mentor: Ira Gantz)
1995-1996 Visiting Scientist, Department of Chemistry Parke-Davis Pharmaceutical Research, Ann Arbor, MI
1996-1998 Postdoctoral Fellow, Oregon Health Sciences University, Portland OR (mentor: Roger D. Cone)
1998-2004 Assistant Professor, Department of Medicinal Chemistry, University of Florida, Gainesville, FL
2004- Associate Professor, Department of Medicinal Chemistry, University of Florida, Gainesville, FL
Joint Assoc Professor with the Department of Physiology and Functional Genomics

Honors and Awards

Elected co-Chair 2008 for the Gordon Research Conference "Peptides, Chemistry & Biology Of"
University of Florida Research Foundation (UFRF) Research Professor Award (2005-2008)
Invited Guest Editor (2 special issues) focused on the "Melanocortins" for the journal *Peptides* (2005-2006)
2002 Sigma Xi Junior Faculty Research Award, University of Florida Chapter
1998-2003 Burroughs Wellcome Fund Career Award in the Biomedical Sciences

Patents

WO 03/095474 A2 (2003) "Peptides and Methods for the Control of Obesity"
WO 2005/000877 A2 (2005) "Novel Melanocortin Receptor Peptide Template for the Treatment of Obesity"
60/622,436 (Filed Nov 2005) "Compositions for the Treatment of Premature Labor, Cushing's Syndrome and Related Disorders"

National Service: NIH Molecular Libraries & Imaging Roadmap Initiative Evaluation Planning Meeting September 2005. **Member** NIH Synthetic and Biological Chemistry-B (SBC-B) Study Section (2005-2009). **Ad hoc**, NIH Bio-Organic and Natural Products Chemistry (BNP) Study Section March, 2001, March 2004, **Ad hoc**, NIH Molecular and Cellular Endocrinology (MCE) Study Section (Oct, 2004), **Ad hoc**, Synthetic and Biological Chemistry-B (SBC-B) Study Section (Feb, 2005), **Ad hoc** reviewer, NSF **Ad hoc** reviewer Howard Hughes Medical Institute BCEERU program (2005).

Selected Peer-Reviewed Publications (from >60 total)

Structure Activity Studies of the Melanocortin-4 Receptor by *In Vitro* Mutagenesis: Identification of Agouti-Related Protein (AGRP), Melanocortin Agonist and Synthetic Peptide Antagonist Interaction Determinants, Haskell-Luevano, C., Cone, R.D., Monck, E.K., and Wan, Y.-P. *Biochemistry* 40:6164-6179 (2001).

Characterization of Melanocortin NDP-MSH Agonist Peptide Fragments at the Mouse Central and Peripheral Melanocortin Receptors, Haskell-Luevano, C., Holder, J.R., Monck, E.K., and Bauzo, R. *J. Med. Chem*. 44:2247-2252 (2001).

Novel Agouti-related Protein (AGRP) Based Melanocortin-1 Receptor Antagonist, Thirumoorthy, R., Holder, J.R., Bauzo, R.M., Richards, N., Edison, A., and Haskell-Luevano, C., *J. Med. Chem*. 44:4114-4124 (2001)

Structure-Activity Relationships of the Melanocortin Tetrapeptide Ac-His-DPhe-Arg-Trp-NH_2 at the Mouse Melanocortin Receptors: Part I Modifications at the His Position, Holder, J.R., Bauzo, R.M., Xiang, Z., and Haskell-Luevano, C. *J. Med. Chem*., 45:2801-2810 (2002).

Structure-Activity Relationships of the Melanocortin Tetrapeptide Ac-His-DPhe-Arg-Trp-NH_2 at the Mouse Melanocortin Receptors: Part 2 Modifications at the Phe Position, Holder, J.R., Bauzo, R.M., Xiang, Z., and Haskell-Luevano, C. *J. Med. Chem*., 45:3073-3081 (2002).

A Solid Phase Approach to Mouse Melanocortin Receptor Agonists Derived from a Novel Thioether Cyclized Peptidomimetic Scaffold, Bondebjerg, J., Xiang, Z., Bauzo, R.M., Haskell-Luevano, C., and Meldal, M. *J. Am. Chem. Soc.*., 124:11046-11055 (2002).

Structure-Activity Relationships of the Melanocortin Tetrapeptide Ac-His-DPhe-Arg-Trp-NH_2 at the Mouse Melanocortin Receptors: Part 4 Modifications at the Trp Position, Holder, J.R., Xiang, Z., Bauzo, R.M., and Haskell-Luevano, C. *J. Med. Chem*., 45:5736-5744 (2002).

Structure-Activity Relationships of the Melanocortin Tetrapeptide Ac-His-DPhe-Arg-Trp-NH_2 at the Mouse Melanocortin Receptors: Part 3 Modifications at the Arg Position, Holder, J.R., Xiang, Z., Bauzo, R.M., and Haskell-Luevano, C. *Peptides*, 24:73-82 (2003).

Characterization of Aliphatic, Cyclic, and Aromatic N-Terminally "Capped" His-DPhe-Arg-Trp-NH_2 Melanocortin Tetrapeptides at the Melanocortin Receptors, Holder, J.R., Marques, F.F., Xiang, Z., Bauzo, R.M., and Haskell-Luevano, C. *Eur J. Pharmacol*., 462:41-52 (2003).

Elongation Studies of the Human Agouti-Related Protein (AGRP) Core Decapeptide (Yc[CRFFNAFC]Y) Results in Antagonism at the Mouse Melanocortin-3 Receptor, Joseph, C.G., Bauzo, R.M., Xiang, Z., Shaw, A.M., Millard, W.J., and Haskell-Luevano, C. *Peptides,* 24:263-270 (2003).

Urea Small Molecule Melanocortin Receptor Agonists, Joseph, C.G., Bauzo, R.M., Xiang, Z., and Haskell-Luevano, C. *BioOrg. & Med. Chem. Letts.* 13:2079-2082 (2003).

Design and Pharmacology of Peptiods and Peptide-Peptoid Hybrids Based on the Melanocortin Agonist Core Tetrapeptide Sequence, Holder, J.R., Bauzo, R.M., Xiang, Z., Scott, J.W., and Haskell-Luevano, C. *BioOrg. & Med. Chem. Letts.* 13:4505-4509 (2003).

Chimeric NDP-MSH and MTII Melanocortin Peptides with Agouti-Related Protein (AGRP) Arg-Phe-Phe Amino Acids Possess Agonist Melanocortin Receptor Activity, Joseph, C.G., Wilczynski, A., Holder, J.R., Xiang, Z., Bauzo, R.M, Scott, J. W., and Haskell-Luevano, C. *Peptides*, 24:1899-1908 (2003).

Design, Synthesis, and Pharmacology of Amide Bond Modifications of the Melanocortin Xaa-DPhe-Arg-Trp-NH_2 Tetrapeptide, Todorovic, A., Holder, J.R., Scott, J.W., and Haskell-Luevano, C. *J. Peptide Res*., 63:270-178 (2004).

Identification of Putative Agouti-Related Protein(87-132)-Melanocortin-4 Receptor Interactions by Homology Molecular Modeling and Validation Using Chimeric Peptide Ligands, Wilczynski, A., Wang, X.S., Joseph, C.G., Xiang, Z., Bauzo, R.M, Scott, J.W., Sorensen, N.B., Shaw, A.M., Millard, W.J., Richards, N.G., and Haskell-Luevano, C. *J. Med. Chem*. 47:2197-2207 (2004).

Structural Characterization of a Potent (Cys101-Cys119, Cys110-Cys117) Bicyclic Agouti-Related Protein (AGRP) Melanocortin Receptor Antagonist, Wilczynski, A., Wang, X.S., Bauzo, R.M., Xiang, Z., Shaw, A.M., Millard, W.J., Richards, N.G., Edison, A.S., and Haskell-Luevano, C. *J. Med. Chem.* 47:5662-5673 (2004).

Stereochemical Studies of the Monocyclic Agouti-Related Protein(103-122) Arg-Phe-Phe Residues: Conversion of a Melanocortin-4 Receptor Antagonist into an Agonist and Results in the Discovery of a Potent and Selective Melanocortin-1 Agonist, Joseph, C.G., Wang, X.S., Scott, J.W., Bauzo, R.M., Xiang, Z., Richards, N.G., and Haskell-Luevano, C. *J. Med. Chem.* 47:6702-6710 (2004).

Voluntary Exercise Delays Monogenetic Obesity and Overcomes Reproductive Dysfunction of the Melanocortin-4 Receptor Knockout Mouse, Irani, B., Xiang, Z., Moore, M.C., Mandel, R.J., and Haskell-Luevano, C. *Biochem. Biophys. Res. Commun.,* 236:638-644 (2005).

Bone Morphgenetic Protein Signaling Controls Hair Pigmentation by Means of Cross-Talk with the Melanocortin Receptor-1 Pathway, Sharov, A.A., Fessing, M., Atoyan, R., Sharova, T.Y., Haskell-Luevano, C., Weiner, L., Brissette, J.L., Gilchrest, B.A., Botchkarev, V.A. *Proc. Natl. Acad. Sci.* 102:93-98 (2005).

Meal Patterns and Foraging in Melanocortin Receptor Knockout Mice, Vaughan, C.H., Moore, M.C., Haskell-Luevano, C., and Rowland, N.E. *Physiology & Behavior* 84:129-133 (2005).

N-Terminal Fatty Acylated His-DPhe-Arg-Trp-NH_2 Tetrapeptides: Influence of Fatty Acid Chain Length on Potency and Selectivity at the Mouse Melanocortin Receptors and Human Melanocytes," Todorovic, A., Holder, J.R., Bauzo, R.M., Scott, J.W., Kavanagh, R. Abdel-Malek, Z., and Haskell-Luevano, C. *J. Med. Chem.* 48:3328-3336 (2005).

Structure-Activity Relationships of the Unique and Potent Agouti Related Peptide (AGRP)-Melanocortin Chimeric Tyr-c[Asp-His-DPhe-Arg-Trp-Asn-Ala-Phe-Dpr]-Tyr-NH_2 Peptide Template," Wilczynski, A., Wilson, K.R., Scott, J.W., Edison, A.S., and Haskell-Luevano, C. *J. Med. Chem* 48:3060-3075 (2005).

Melanocortin-4 Receptor-Null Mice Display Normal Affective Licking Responses to Prototypical Taste Stimuli in a Brief-Access Test, Eylam, S., Moore, M., Haskell-Luevano, C., and Spector, A.C. *Peptides* 26:1712-1719 (2005).

Ghrelin-Induced Food Intake and Growth Hormone Secretion is Altered in Melanocortin 3 and 4 Receptor Knockout Mice, Shaw, A.M., Irani, B.G., Moore, M.C., Haskell-Luevano, C., and Millard, W.J. *Peptides* 26:1720-1727 (2005).

Modified Melanocortin Tetrapeptide Ac-His-DPhe-Arg-Trp-NH_2 at the Arginine Side Chain with Ureas and Thioureas, Joseph, C.J. Sorensen, N.B., Wood, M.S., Xiang, Z., Moore, M.C. and Haskell-Luevano, C. *J. Peptide Res*. 66:297-307 (2005).

Evidence for a Stimulatory Action of Melanin Concentrating Hormone (MCH) on Luteinising Hormone Release Involving MCH1 and Melancortin-5 (MC5) Receptors, Murray, J.F., Hahn, J.D., Kennedy, A., Small, C., Bloom, S.R., Haskell-Luevano, C. Coen, C.W., and Wilson, C.A. *J. of Neuroendocrin.* 18:157-167 (2006).

Molecular Mechanism of the Constitutive Activation of the L250Q Human Melnaocortin-4 Receptor Polymorphism, Proneth, B., Xiang, Z., Pogozheva, I.D., Litherland, S.A., Gorbatyuk, O.S., Shaw, A.M., Millard, W.J., Mosberg, H.I., and Haskell-Luevano, C. *Chem. Biol. Drug Des.* 67:215-229 (2006).

Melanoma Prevention Strategy Based on Using Tetrapeptide and α-MSH analogs that Protect Human Melanocytes from UV-induced DNA damage and Cytotoxicity," Abdel-Malek, Z.A., Kadekaro, A.L., Kavanagh, R.J., Todorovic, A.T., Koikov, L.N., McNulty, J.C., Jackson, P.J., Millhauser, G.L., Schwemberger, S., Babcock, G., Haskell-Luevano, C., and Knittel, J.J. *FASEB J* in press

Aza-Scanning of the Potent Melanocortin Receptor Agonist Ac-His-DPhe-Arg-Trp-NH_2, Boeglin, D., Xiang, Z., Sorenson, N.B., Wood, M.S., Haskell-Luevano, C, and Lubell, W.D. *Chem. Biol. Drug Des.* In press

Research Support

ACTIVE

"Voluntary Exercise Identifies New Gene Candidates for the Prevention of Type 2 Diabetes"
American Diabetes Association Research Award 7-05-RA-54 (7/1/05-6/30/08)
Role: Principal Investigator
The objectives of this proposal are to identify new gene candidates that are modified by voluntary exercise in the MC4RKO mouse model of obesity and diabetes.
OVERLAP: NONE

"Human Melanocortin-4 Receptor Polymorphisms"
National Institute of Health 1 R01 DK063974 (1/2004-12/2007)
Role: Principal Investigator
The objectives of this proposal are to pharmacologically characterize the MC4 receptor polymorphisms *in vitro* identified from severely obese children and adults.
OVERLAP: NONE

"Endogenous G-Protein Coupled Receptor Antagonists"
National Institute of Health 1 R01 DK064250 (4/2003-2/2007)
Role: Principal Investigator
The objectives of this proposal are to gain basic structural knowledge of endogenous GPCR antagonist agouti-related protein (AGRP) for the rational design of small molecules that may specifically block AGRP-melanocortin receptor interactions while leaving the agonist-melanocortin receptor interactions undisturbed.
OVERLAP: NONE

"Structural Determinants of Neuroendocrine Receptors"
National Institute of Health R01 DK57080-06A1 (9/2005-8/2008) years 6-9
Role: Principal Investigator
The objectives of this proposal are to synthesize MC3R selective peptides and non-peptide compounds, perform MC3R mutagenesis to identify putative ligand-receptor interactions for selective ligand design purposes.
OVERLAP: NONE

"Design, Synthesis and Characterization of Melanocortin Receptor Ligands"
American Heart Florida/Puerto Rico Affiliate Postdoctoral Fellowship (7/2004-6/2006)
Role: Sponsor Applicant: Dr. Andrzej Wilczynski (Postdoctoral Fellow)

"Structure-Activity-Relationship Studies of Proopiomelanocortin Derived Peptides"
American Heart Florida/Puerto Rico Affiliate Predoctoral Fellowship (7/2004-6/2006)
Role: Sponsor Applicant: Mr. Aleksandar Todorovic (Ph.D. graduate Student)

COMPLETED

"Structural Determinants of Neuroendocrine Receptors"
National Institute of Health R01 DK57080 (8/2000-7/2005) years 1-5
Role: Principal Investigator
The objectives of this proposal are to synthesize MC4R selective peptides and non-peptide compounds, perform MC4R mutagenesis to differentiate agonist versus antagonistic molecular recognition, generate constitutively active MC4Rs, and identify putative agonist-receptor interactions. Additionally, the physiological relevance of the compounds which are selective MC4R agonists or antagonists will be administered to rodents (icv) for their effect on feeding behavior.

"Structural Determinants of Neuroendocrine Receptors"
National Institute of Health R01 DK57080 (1/2001-12/2004)
Minority Supplement for a Ph.D. Graduate Student
Role: Principal Investigator

"Human Melanocortin-4 Receptor Polymorphisms and Obesity"
American Diabetes Association Research Award (1/2003-12/2006)
Role: Principal Investigator
Years 2-3 declined due to the receipt of NIH R01 DK063974 with overlapping experimental design.
The objectives of this proposal are to pharmacologically characterize the MC4 receptor polymorphisms *in vitro* identified from severely obese children and adults.

American Heart Association Florida/Puerto Rico Affiliate Predoctoral Fellowship (7/2002-6/2004)
"The Central Melanocortin System in Obesity and Heart Related Disorders"
Role: Sponsor Applicant/PI: Mr. Boman Irani (Ph.D. graduate Student)

"Determination of the Physiological and Pharmacological Role of the Brain Specific Agouti-related Transcript, ART"
Burroughs Wellcome Fund Career Award in the Biomedical Sciences (9/1998-8/2003)
Role: Principal Investigator

"Structure-Activity Studies of Melanocortin Receptors"
National Research Service Award, funded by NIH, 1F32DK09231 (7/1995-8/1998)
Role: Principal Investigator