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**Education**

1975 A.B. Biochemistry University of California at Berkeley

1980 Ph.D. Pharmacology Univ. of Wisconsin Medical School, Madison

**Post-Graduate Education and Training**

1981 - 1984 Staff Fellow, NRSA Postdoctoral Fellow  
 and Pharmacology Research Associate Trainee (PRAT program)  
 Laboratory of Preclinical Pharmacology,  
 NIMH, St. Elizabeth's Hospital, Washington D.C.

**Employment**

1984 - 1989 Assistant Professor, Dept. of Biochemistry and Molecular Biology  
 Louisiana State University Medical School  
 New Orleans, LA

1989 - 1994 Associate Professor (tenured), Dept. of Biochemistry and Molecular Biology,  
 Louisiana State University Health Sciences Center (name changed)  
 New Orleans, LA

1994 - 2007 Professor, Dept. of Biochemistry and Molecular Biology  
 Louisiana State University Health Sciences Center  
 New Orleans, LA

2006 - 2007 LSUHSC Cancer Center Member

2007 - present Professor, Department of Anatomy and Neurobiology  
 University of Maryland School of Medicine  
 Baltimore, MD  
*Secondary Appointment:* Department of Biochemistry  
*Member:* Greenebaum Cancer Center

**Professional Society Memberships**

1978 - present Society for Neuroscience

1982- present Winter Conference on Brain Research

1985 - 2005; 2011-pres. American Society for Biochemistry and Molecular Biology  
 2013- 2014 American Society for Bone and Mineral Research  
 2001 - 2018 The Endocrine Society

### Career Development Awards and Honors

1981 NIH Individual Postdoctoral Fellowship (switched to PRAT)  
 1981-1983 Pharmacology Research Associate Traineeship (PRAT)  
 1988-1993 Research Career Development Award (NIDDK)  
 1993-1998 Research Scientist Development Award (NIDA)  
 1998-2003 Research Scientist Development Award (NIDA)  
 2018 Elected AAAS Fellow (Biological Sciences)

### Administrative Service

#### *Institutional Service (Committees)*

1985-2007 LSUHSC Neuroscience Center Executive Steering Committee  
 1986-1988 Biochemistry Dept. Graduate Recruitment Committee  
 1992-1997 LSUHSC Graduate Council  
 1996-2000 LSUHSC Neuroscience Center Faculty Recruitment Committee  
 1997-2002 Neuroscience Center Graduate Program Recruitment Committee  
 2001 LSU School of Medicine Research Retreat Committee  
 2003-2004 Emergency Preparedness Faculty Committee, LSUHSC  
 2003-2005 LSUHSC Research Council  
 2004 Biochemistry Dept. Graduate Recruitment Committee  
 2004-2005 Faculty Search Committee, Biochemistry Department  
 2004-2005 Graduate Advisor, Biochemistry Department  
 2004-2005 LSUHSC Graduate Council  
 2005-2007 Faculty Assembly, LSUHSC

2007- 2015 Program in Neuroscience Seminar Committee, University of Maryland  
 2007- 2012 Program in Neuroscience Training Committee, University of Maryland  
 2008-2013 Dept. Anatomy & Neurobiology Faculty Search Committee  
 2008- 2011 Proteomics Core Steering Committee, University of Maryland  
 2009- 2010 Pharmacology Head Search Committee, University of Maryland  
 2009- 2016 Departmental Representative or Alternate, School of Medicine Council  
 2010, 2012 Qualifying Exam Committee, Program in Neuroscience  
 2010- 2014 **Chair**, Program in Neuroscience Retreat Committee  
 2012- 2015 Univ. of Maryland Program in Neurosciences Postdoctoral Training Grant Steering Committee

2011 Univ. of Maryland Strategic Plan Subcommittee (Research)  
 2010- 2015 Junior faculty mentoring committees, Drs. Elizabeth Powell; Marta Lipinski  
 2007- present Dept. Anatomy & Neurobiology APT Committee; **Chair, 2010- 2014**  
 2009- present Biomedical Research Radiation Safety Committee, University of Maryland;  
**Chair, 2016- present**

2009- present                    **Organizer**, Departmental "Second Monday" Work-in-Progress seminar series

### ***Other Institutional Service***

1990, 1992, 1995, 1997    LSUHSC Design & production of Biochemistry Dept. recruitment brochure  
 1997-2002                    LSUHSC Neuroscience Center brochure production  
 2004- 2006                 LSUHSC Grantsmanship presentations to faculty and students  
 2008                         Presentation to UMB graduate students: "How to Succeed in Grad School"  
 2010                         "Getting an RSDA" (Wendy Sanders' Professional Skills program)  
 2018                         Women in Science and Medicine Chapter Organizer

### ***Ph.D. Thesis Committees***

#### **Louisiana State University Health Sciences Center:**

Minetta Gardinier, Jeremy Springhorn, Richard Shen, Yi Zhou, John Mathis, Tamim Shaikh, Erik Pakarinen, Joomyeong Kim, Virginia Strand, Astrid Roy, Ping Wei, Mary Breslin, Neva West, Yolanda Fortenberry, Mike Serou, Changning Gong, Bin Tu, Peimin Zhu, Yuri Peterson, Faramarz Taheri, Eleanor Park, and Tanya Roy

#### **University of Maryland-Baltimore:**

Amanda Elson, Zhongping Liu, Akina Hoshino, Adam Clark, Erik Martin, Patricia Cunfer (Young), Alexandra Winters, and Julia Peters

### ***Other Local Service***

1985-86, 1988-89            *Secretary*, Greater New Orleans Society for Neuroscience  
 2005-2006                    *President*, Greater New Orleans Society for Neuroscience  
                                       In 2005-06, my major duty was to organize the distribution of \$100,000 in Katrina relief funds from the national Society for Neuroscience to local neuroscience graduate students.  
 2012-2013                    *President*, Greater Baltimore Society for Neuroscience  
 2014- present                *Treasurer*, Greater Baltimore Society for Neuroscience

### ***National Service***

#### ***Journal Manuscript Review***

1990- present            *Ad hoc* reviewer, *J. Biol. Chem.*, *J. Neurochem.*, *Peptides*, *J. Neurosci.*,  
*Analyt. Biochem.*, *FEBS Lett.*, *Protein Eng.*, *Design and Selection*, *Proc. Natl. Aca.d Sci*, *Endocrine Rev.*, *Diabetes*, *Molecular Medicine and Metabolism*, *Mol. Cell. Endocrinol.*, *J. Endocrinol.*, *Endocrinol*, *PLoS One*, *Mol. Biol. Cell*, *Eur. J. Cell Biol.*, and many others  
 2000-2005                 Editorial Board Member, *Journal of Biological Chemistry*  
 2012-2017                 Editorial Board Member, *Journal of Biological Chemistry*

#### ***Gordon Conference Service***

1998, 2000                 Advisory Committee Member, Gordon Conference:  
*Hormonal and Neural Peptide Synthesis*

- 2002 Vice-Chair, Gordon Conference: *Hormonal and Neural Peptide Synthesis*  
 2004 **Chair, Gordon Conference:** *Proprotein Processing, Trafficking, and Secretion*  
 2006-2019 Advisory Committee Member, Gordon Conference: *Proprotein Processing, Trafficking, and Secretion*

#### ***National Society Service***

- 2008-2011 Winter Conference on Brain Research, *Scientific Board*  
 2017-present Society for Neuroscience, travel application and trainee professional development awards review committees  
 2019 AAAS If/Then Ambassador reviewer

#### ***Grant Reviewer, NIH:***

- 1987 Study section reviewer, NLS1  
 1989, 1997 Study section reviewer, NIDA Biochemistry  
 1989, 1990 Special emphasis panel member, NIDDK  
 1991 Study section reviewer, NIMH career awards  
 1994 Special emphasis panel member, NINDS  
 1995 Study section reviewer, NLS1  
 1995, 1996, 1998 Study section and special emphasis panel reviewer, END/NIDDK  
 1996, 1997, 2002 Study section reviewer, NLS1  
 1996-2000 **Standing member, Endocrinology study section**  
 1999 Study section reviewer, ACS  
 2000 NIMH Career Awards study section reviewer  
 2000-2005 Endocrinology study section reviewer ( about 1 panel per year)  
 2007-2010 **Standing member, Molecular and Cellular Endocrinology study section**  
 2010 Special Emphasis Panel reviewer, NIDDK 2/2010  
 2011 *EUREKA* NIH review panel member 12/2011  
 2013 SBIR study section, 3/2013  
 2015 MCE study section *ad hoc* service 6/2015; SBIR *ad hoc* service 10/2015  
 2016 Special Emphasis Panel 6/2016  
 2018 NIH internal review site visit 5/2018; NIDA internal review site visit, 12/2018

#### ***International Review Service***

- 2002 Finnish National Academy of Sciences Review Panel, Helsinki, Finland  
 2002, 2009, 2016 Canada Research Chairs, College of Reviewers  
 2003 Chair, Finnish National Academy of Sciences Review Panel  
 2005 Foundation for Scientific Research- Flanders, Belgium, grant reviewer  
 2006 Wellcome Trust grant reviewer  
 2008-2016 Foundation for Scientific Research- Flanders, Belgium, grant reviewer  
 2011 Medical Research Council (U.K.), grant reviewer  
 2013, 2016 Canadian Institutes of Health, grant reviewer  
 2014 Danish Agency for Science Technology and Innovation, grant reviewer

*Teaching Service***LSUHSC**

1985- 1986	Dental Biochemistry (17 lecture h per year) - 85 students
1985-2005	One lecture in “Methods in Neuroscience” - 15 students (course given at Tulane University in alternate years on protein expression methods) (2 h)
1987 -1999	Medical Biochemistry (17 h) -150 students
1991, fall	Graduate seminar in the cell biology of protein targeting (20 h) 8 students
1995 - 2001	Neuroscience Survey (2 h) 8 students
1997	Endocrinology (on radioimmunoassay and opioid peptides) (2 h) 10 students
1998- 2004	Molecular Neuroscience (on neurotransmitters) (4 h) 8 students
2000	Nursing Biochemistry (20 h) 80 students
2001	Graduate Seminar in Protein Motifs (20 h) 7 students
2001, 2002	Special Topics Graduate Seminar in Methods in Biochemistry; (Protein Expression and Purification) (2 h); 8 students
2003, 2006,2007	Endocrinology - Bioactive peptides and radioimmunoassay (4 h and 2h); 12 students
2003-2005	Graduate Seminar- “Professional Skills”. Graduate student mentoring: giving talks, preparing grants, manuscripts, career choices (30 h); 12 students
2006	Dental Biochemistry (4 h); 85 students
2006	Molecular Neuroscience - Neuropeptides (4 h) and Grantsmanship (1 h)

**University of Maryland-Baltimore**

2008- 2010	(UMB) in Professional Skills course in Molecular Medicine “How to Write/Review Grants” (1 h) ; 20 students
2008- present	GPILS Core Course “Posttranslational Modifications” (2 h); 50 students
2009- 2016	Ethics Class, Discussion Leader (1.5 h) twice a year (small group of 10-15)
2010 -present	Systems Neuroscience (GPILS 641) “Neuropeptides” (2 h); 10-12 students
2010- present	Structure and Development “Thyroid, Parathyroid, and Adrenal” (1 h); 180 students
2015- present	Medical Neuroscience “Monoamines” and “Peptide Neuromodulators” (2h); 180 students

**Students and postdoctoral fellows supervised***Graduate Students supervised (rotation students not listed)*

1. Fu-Sheng Shen (1986- 1988) (Ph.D. 1990, from Institute of Physiology, Beijing)
2. John Mathis (1988- 1994) Ph.D. 1994
3. Yi Zhou (1990- 1994) Ph.D. 1994
4. Yolanda Fortenberry (1997- 2001) Ph.D. 2001
5. Maria Sayah (3/00- 12/00) (Master’s thesis; French practical training)
6. Valery Iattignon (1/04- 4/04) (Master’s thesis; French practical training)
7. Akina Hoshino (11/07- 4/2012) Ph.D. 2012

8. Alexandra Winters (2013-2016) (co-mentor with Dr. Toni Pollin) Ph.D. 2016
9. Benjamin Grosso (2019- present)

*Postdoctoral Fellows supervised*

1. Dr. Nympha D'Souza (1987-1988)
2. Dr. Steven Roberts (1988- 1991)
3. Dr. Joseph Irvine (1989- 1991)
4. Dr. Fu-Sheng Shen (1991- 1992)
5. Dr. Osvaldo Vindrola (1991- 1993)
6. Dr. Nazarius Lamango (1994- 1996)
7. Dr. Xiaorong Zhu (1994- 1997) (**NRSA Fellowship**)
8. Dr. Karla Johanning (1994- 1998)
9. Dr. Laurent Muller (1996- 1999)
10. Dr. Ekaterina Apletalina (1997- 2000)
11. Dr. Jae-Ryoung Hwang (1998- 2001)
12. Dr. Angus Cameron (1999- 2000)
13. Dr. Virginie Laurent (1999-2002)
14. Dr. Ashok Dubey (2000- 2001)
15. Dr. Miroslav Sarac (2000- 2003)
16. Dr. Emmanuel Prodhomme (2001-2002)
17. Dr. Weidong Liu (2001-2002)
18. Dr. Sang-Nam Lee (2002- 2007)
19. Dr. Juan Ramon Peinado (2003-2004; 2013; 2019) **Visiting Assistant Professor, Ciudad Real University**
20. Dr. Magdalena Kacprzak (2003- 2005)
21. Dr. Bainan Liu (2004- 2005)
22. Dr. Dorota Kowalska (2005) and (2008-2009)
23. Dr. Wagner Judice (2006- 2007) (**NIDA INVEST Fellow**)
24. Dr. Jin Liu (2006- 2008)
25. Dr. Akihiko Ozawa (2006- 2011)
26. Dr. Michael Helwig (2009- 2012) (**supported by Leopoldina Fellowship**)
27. Dr. Mirella Vivoli (2010- 2012)
28. Dr. Indrani Dasgupta (2011-2013)
29. Dr. Laura Sanglas (2011-2012) (**supported by Danish Academy Fellowship**)
30. Dr. Hiroyuki Yamamoto (2013; (**Visiting Assistant Professor, Shizuoka, Japan**))
31. Dr. Elias Blanco (2013- 2015) (**stipend from Chilean government**)
32. Dr. Yogikala Prabhu (2011; 2013)
33. Dr. Bruno Ramos-Molina (2014- 2015)
34. Dr. Timothy Jarvela (2015-present) (**UMB SOM Diabetes Training Grant 2016-2019**)
35. Dr. Tomas Bachor (2017- 2018)
36. Dr. Manita Shakya (2018-present)

**Grant Support***Ongoing Research Support*

**ProSAAS-mediated neuroprotective mechanisms in Alzheimer's and Parkinson's diseases: the role of secretory chaperones in neurodegeneration** 2/01/19- 1/31/24

R01 AG062222-01 I. Lindberg and N. Maidment, Co-PIs (33% effort)

NIH/NIA

This grant is to investigate the ability of the neural secretory chaperone proSAAS to influence the deposition of amyloid into plaques, and synuclein into Lewy bodies.

**Opioid Peptide Synthesizing Enzymes** 7/01/17- 6/30/22

R01 DA042351-01A1 I. Lindberg (PI) (32% effort)

NIH/NIDA

This grant is to investigate the role of human *PCSK1* mutations and polymorphisms in peptide-mediated hypothalamic obesity mechanisms.

*Completed Research Support (Competing NIH applications and other grants)*

1/85 - 12/86	I. Lindberg, PI "Pharmacologic control of opioid peptide biosynthesis." Pharmaceutical Manufacturer's Association Starter Grant
4/85 - 11/88	I. Lindberg, PI (30% effort) "Biosynthesis of enkephalin in the adrenal medulla." R01 DK35199-01
4/88 - 3/91	I. Lindberg, PI (30% effort) "Opioid peptide-synthesizing enzymes" R01 DA05084-01
7/88 - 6/93	I. Lindberg, PI (90% salary) Research Career Development Award K04 DK 01868 (salary award)
12/88 - 11/91	I. Lindberg, PI (30% effort) "Biosynthesis of enkephalin in the adrenal medulla." R01 DK35199-04
4/91 - 3/94	I. Lindberg, PI (30% effort) "Opioid peptide-synthesizing enzymes" R01 DA 05084-04
10/93- 9/98	I. Lindberg, PI (75% salary) Research Scientist Development Award K02 DA00204-01 (salary award)
4/94 - 3/99	I. Lindberg, PI (30% effort) "Opioid peptide-synthesizing enzymes" R01 DA 05084-07
7/96- 3/02	I. Lindberg, PI (30% effort) "Control of peptide hormone biosynthesis by PC2 and 7B2" R01 DK49703-01
10/98- 9/03	I. Lindberg, PI (75%) Research Scientist Development Award

- 4/99- 3/04 K02 DA 00204-06 (salary award renewal)  
I. Lindberg, PI (30% effort)  
"Opioid peptide-synthesizing enzymes"  
R01 DA005084-12
- 4/02- 3/07 I. Lindberg, PI (30% effort)  
"Control of peptide hormone biosynthesis by PC2 and 7B2"  
R01 DK49703-06
- 2004 I. Lindberg, PI Gordon Conference support grant  
"Proprotein processing, trafficking and secretion"  
5R13 DK061936
- 2004 I. Lindberg, PI NSF Conference Support: received \$2,000 for a poster award  
program for the same Gordon Conference cited above
- 4/04-3/09 I. Lindberg, PI (30% effort)  
"Opioid peptide-synthesizing enzymes"  
R01 DA005084-17
- 9/02-8/05 I. Lindberg, PI (20% effort)  
"Blockade of anthrax toxin cytotoxicity using furin inhibitors"  
R21 AI053517-01
- 8/03-8/06 P. Sunkara, PI (5% effort)  
"Hexa-D-Arg: a furin inhibitor for anthrax biodefense"  
Subcontract, Molecular Therapeutics  
SBIR R43 AI 056850
- 9/04-3/06 S. Pincus, PI (5% effort)  
"Furin Inhibition in HIV Disease"  
R21 AI058714-01
- 3/06-6/06 I. Lindberg, PI (10% effort)  
"Furin as an Anti-Cancer Target"  
Louisiana Cancer Research Consortium
- 6/09- 5/11 I. Lindberg, PI (20% effort)  
"Identification of Novel Peptide Hormones"  
R21 DK084481-01
- 9/09- 3/14 I. Lindberg (P.I.) (30% effort)  
"Control of peptide hormone biosynthesis by PC2 and 7B2"  
R01 DK49703-12
- 7/09-6/14 I. Lindberg and B. Roth (co-P.I.s) (30% effort)  
"De-orphanizing the peptidome"  
R01 DA027170-01
- 4/09-3/14 I. Lindberg, PI (30% effort)  
"Opioid peptide-synthesizing enzymes"  
R01 DA005084-22
- 4/15-6/17 I. Lindberg (P.I) (20% effort) (bridge support)  
"Opioid Peptide Synthesizing Enzymes"



R56 DA05084-28A1

9/14-4/18 I. Lindberg (P.I.) (20% effort)  
 “The Secretary Chaperone 7B2 as an Endogenous Regulator of  
 Amyloid Pathology”  
 R21 AG045741-02

**ARRA Supplement** received in 2010 for purchase of AKTA FPLC (\$70,000)

Contributed sections to several **COBREs** and **equipment grants** awarded to LSUHSC faculty; also contributed to various **ARRA Equipment Supplement/ Multi-User Equipment** applications at the University of Maryland).

### *Research Support as Mentor*

7/95-6/98 Mentor to Dr. Xiaorong Zhu, NRSA postdoctoral fellowship  
 10/97-8/00 Mentor to Ms. Yolanda Fortenberry, NRSA predoctoral fellowship  
 12/06-12/07 Mentor to Dr. Wagner Judice, NIDA INVEST fellowship  
 08/10-08/12 Mentor to Dr. Michael Helwig, Leopoldina fellowship  
 06/11-6/12 Co-mentor to Dr. Laura Sanglas, Danish Academy fellowship  
 05/16-4/19 Mentor to Dr. Timothy Jarvela, UMSOM Diabetes and Obesity Training Grant

### **Patents**

1. Patent # 6,548,736 on the 7B2 null mouse as a model for pituitary Cushing's was granted in 1999 to C.H. Westphal, **I. Lindberg**, and P. Leder.
2. Patent # 7,033,991 on polyarginine furin inhibitors in inhibiting bacterial disease and cancer was granted on April 25, 2006 to **I. Lindberg**, A. Cameron, J. Appel, and R.A. Houghten.

### **Publications**

#### *Peer-Reviewed Journals*

1. **Lindberg, I.**, Smythe, S., and Dahl, J.L. (1979) Distribution of enkephalin in bovine brain. *Brain Research*, 168, 200-203.
2. **Lindberg, I.**, and Dahl, J.L. (1981) Characterization of enkephalin release from rat striatum. *J. Neurochem.* 36, 506-512.
3. Epstein, M., **Lindberg, I.**, and Dahl, J.L. (1981) Development of enkephalinergic neurons in the gut of the chick. *Peptides* 2, 271-276.
4. **Lindberg, I.**, Yang, H.-Y.T., and Costa, E. (1982) An enkephalin-generating enzyme in bovine adrenal medulla. *Biochem. Biophys. Res. Commun.* 106, 186-1934.
5. Dahl, J.L., Epstein, M.L., Silva, B.W., and **Lindberg, I.** (1982) Multiple forms of met<sup>5</sup>- and leu<sup>5</sup>-enkephalin in fetal and neonatal rat brain and gut. *Life Sci.* 31, 1853-1856.
6. **Lindberg, I.**, Yang, H.-Y.T., and Costa, E. (1982) Characterization of a partially purified trypsin-like enkephalin-generating enzyme in bovine adrenal medulla. *Life Sci.* 31, 1713-1716.
7. **Lindberg, I.**, Yang, H.-Y.T., and Costa, E. (1983) A high molecular weight form of met<sup>5</sup>-enk-arg<sup>6</sup>-gly<sup>7</sup>-leu<sup>8</sup> in rat brain and bovine adrenal chromaffin granules. *Life Sciences* 33 Supp. I., 5-8.
8. **Lindberg, I.**, and Yang, H.-Y.T. (1984) Distribution of met<sup>5</sup>-enk-arg<sup>6</sup>-gly<sup>7</sup>-leu<sup>8</sup>-immunoreactive peptides in rat brain: presence of multiple immunoreactive forms. *Brain Research* 299, 73-78.

9. **Lindberg, I.**, Yang, H.-Y.T., and Costa, E. (1984) Further characterization of an enkephalin-generating enzyme from bovine adrenal chromaffin granules. *J. Neurochem.* 42, 1411-1419.
10. **Lindberg, I.**, Yang, H.-Y.T., and Costa, E. (1985) Release of multiple immunoreactive forms of met<sup>5</sup>-enk-arg<sup>6</sup>-gly<sup>7</sup>-leu<sup>8</sup> from rat brain. *Neuropeptides* 5, 541-544.
11. **Lindberg, I.**, and White, L. (1986) Reptilian enkephalins: implications for the evolution of proenkephalin. *Arch. Biochem. Biophys.* 245, 1-7.
12. Wang, Y.N. and **Lindberg, I.** (1986) Distribution and characterization of met-enk-arg-gly-leu in the gastrointestinal tract of the rat. *Cell and Tiss. Res.* 244, 77- 85.
13. **Lindberg, I.**, and White, L. (1986) Distribution of immunoreactive Peptide B in the rat brain. *Biochem. Biophys. Res. Commun.* 139, 1024-1032.
14. **Lindberg, I.** (1986) Reserpine-induced alterations in the processing of proenkephalin in cultured chromaffin cells: increased amidation. *J. Biol. Chem.* 261, 16317- 16323.
15. Panula, P., and **Lindberg, I.** (1987) Pituitary enkephalins: biochemical and immunohistochemical observations. *Endocrinology* 121, 48-58.
16. Byrd, J., Naranjo, J., and **Lindberg, I.** (1987) Proenkephalin gene expression in the PC12 cell line: stimulation by sodium butyrate. *Endocrinology* 121, 1299-1305.
17. D'Souza, N. and **Lindberg, I.** (1988) Evidence for the phosphorylation of a proenkephalin-derived peptide, Peptide B. *J. Biol. Chem.* 263, 2548-2552.
18. Shen, F.S. and **Lindberg, I.** (1988) Characterization of enkephalin-immunoreactive peptides generated from plasma proteins by peptic digestion. *Endocrinology* 122, 2905-2910.
19. Shen, F-S., and **Lindberg, I.** (1989) Purification and assay of opioid activity of low molecular weight enkephalin-immunoreactive peptides generated by peptic digestion of rat plasma proteins. *Neuropeptides* 13, 23-28.
20. Shen, F.-S., Roberts, S.F., and **Lindberg, I.** (1989) A putative processing enzyme for proenkephalin in bovine adrenal chromaffin granules- purification and characterization. *J. Biol. Chem.* 264, 15600-15605 (1989).
21. **Lindberg, I.**, and Thomas, G. (1990) Cleavage of proenkephalin by a chromaffin granule processing enzyme. *Endocrinology* 126, 480-487.
22. Irvine, J., Roberts, S.F., and **Lindberg, I.** (1990) Electrophoretic analysis of proteinases in sodium dodecyl sulfate polyacrylamide gels containing copolymerized radiolabelled protein substrates: application to proenkephalin processing enzymes. *Analyt. Biochem.* 190, 141-146.
23. **Lindberg, I.**, Shaw, E., Finley J., Leone, D., and Deininger, P. (1991) Posttranslational modifications of recombinant rat proenkephalin overexpressed in Chinese hamster ovary cells. *Endocrinology* 128, 1849-1856.
24. Irvine, J.W., and **Lindberg, I.** (1991) Partial purification and characterization of a putative prohormone processing enzyme complex from bovine pituitary. *Endocrinology*, 128, 2345- 2352.
25. **Lindberg, I.**, and Shaw, E. (1992) Posttranslational processing of proenkephalin in a human neuroblastoma cell line, SK-N-MC. *J. Neurochem.* 58, 458-453.
26. Roberts, S.F., Irvine, J.W., and **Lindberg, I.** (1992) Proteolytic activity in bovine adrenal chromaffin granules visualized using [<sup>35</sup>S]methionine-labelled proenkephalin copolymerized into SDS-PAGE. *J. Neurochem.* 58, 593-599.
27. **Lindberg, I.**, Lincoln, B., and Rhodes, C.J. (1992) Fluorometric assay of a calcium-dependent, paired basic processing endopeptidase present in insulinoma granules. *Biochem. Biophys. Res. Commun.* 183, 1-7.
28. Vindrola, O., and **Lindberg, I.** (1992) Biosynthesis of the prohormone convertase mPC1 in AtT-20 cells. *Mol. Endocrinol.* 6, 1088-1094.

29. Mathis, J., and **Lindberg, I.** (1992) Posttranslational processing of proenkephalin in AtT-20 cells: evidence for cleavage at a Lys-Lys site. *Endocrinology* 131, 2287-2296.
30. Zhou, Y., and **Lindberg, I.** (1993) Purification and characterization of the prohormone convertase PC1 (PC3). *J. Biol. Chem.* 268, 5615- 5623.
31. Shen, F.S., Seidah, N.G., and **Lindberg, I.** (1993) Biosynthesis of the prohormone convertase PC2 in Chinese hamster ovary cells and in rat insulinoma cells. *J. Biol. Chem.* 268, 24910-24915.
32. Breslin, M., **Lindberg, I.**, Benjannet, S., Lazure, C., Mathis, J.P., and Seidah, N.G. (1993) Processing of proenkephalin by PC1(PC3), PC2, and furin. *J. Biol. Chem.* 268, 27084-27093.
33. Vindrola, O., and **Lindberg, I.** (1993) Release of the prohormone convertase PC1 from AtT-20 cells. *Neuropeptides* 25, 151-160.
34. Hornby, P.J., Rosenthal, S.D., Mathis, J.P., Vindrola, O., and **Lindberg, I.** (1993) Immunocytochemical analysis of the neuropeptide-synthesizing enzyme PC1 in AtT-20 cells. *Neuroendocrinol.* 58, 555-563.
35. Dupuy, A., **Lindberg, I.**, Zhou, Y., Akil, H., Lazure, C., Chretien, M., Seidah, N.G., and Day, R. (1994) Processing of prodynorphin by the prohormone convertase PC1 results in high molecular weight intermediate forms: cleavage at a single arginine. *FEBS Lett.* 337:60-65.
36. O'Hara, B.F., Donovan, D., **Lindberg, I.**, Brannock, M.T., Ricker, D.D., Moffatt, C.A., Klaunberg, B.A., Schindler, C., Chang, T.S.K., Nelson, R.J., and Uhl, G.R. (1994) Proenkephalin transgenic mice: a short promoter confers high testis expression and reduced fertility. *Mol. Reprod. and Devel.* 38, 275-284.
37. Martens, G.M., Braks, A.M., Eib, D., Zhou, Y., and **Lindberg, I.** (1994) The neuroendocrine polypeptide 7B2 is a naturally occurring inhibitor of the prohormone convertase PC2. *Proc. Nat. Acad. Sci.* 91, 5784-5785.
38. **Lindberg, I.** (1994) Evidence for cleavage of the PC1/PC3 prosegment in the endoplasmic reticulum. *Mol. Cell. Neurosci.* 5, 263-268.
39. Zhou, Y., and **Lindberg, I.** (1994) Enzymatic properties of carboxy-terminally truncated prohormone convertase 1 (PC1/PC3). *J. Biol. Chem.* 269, 18408-18413.
40. **Lindberg, I.**, Ahn, S.C., and Breslin, M.B. (1994) Cellular distributions of the prohormone processing enzymes PC1 and PC2. *Mol. Cell. Neurosci.* 5, 614-622.
41. **Lindberg, I.**, Van den Hurk, W.H., Bui, C.B., and Batie, C.J. (1995) Enzymatic characterization of immunopurified prohormone convertase PC2: potent inhibition by a 7B2 peptide fragment. *Biochemistry* 34, 5486- 5493.
42. Rothenberg, M.E., Eilertson, C.D., Klein, K., Zhou, Y., **Lindberg, I.**, McDonald, J.K., and Noe, B.D. (1995) Processing of mouse proglucagon by recombinant PC1 and PC2. *J. Biol. Chem.* 270, 10136-10146.
43. Van Horssen, A. M., Van den Hurk, H., Bailyes, E.M., Hutton, J.C., Martens, G.J.M., and **Lindberg, I.** (1995) Identification of the region within the neuroendocrine polypeptide 7B2 responsible for the inhibition of prohormone convertase 2. *J. Biol. Chem.* 270, 14292-14296.
44. Zhu, X., and **Lindberg, I.** (1995) 7B2 facilitates the maturation of proPC2 in neuroendocrine cells and is required for the expression of enzymatic activity. *J. Cell Biol.* 129, 1641-1650.
45. Zhou, Y., Rovere, C., Kitabgi, P., and **Lindberg, I.** (1995) Mutational analysis of PC1 in PC12 cells: 66 kDa PC1 is fully functional. *J. Biol. Chem.* 270, 24702-24706.
46. Johanning, K., Mathis, J.P., and **Lindberg, I.** (1996) Role of the prohormone convertase PC2 in proenkephalin processing: antisense and overexpression studies. *J. Neurochem.* 66, 898-907.
47. Zhu, X., Rouille, Y., Lamango, N. S., Steiner, D. F., and **Lindberg, I.** (1996) Internal cleavage of the PC2 inhibitor 7B2 CT peptide: a potential inactivation mechanism. *Proc. Natl. Acad. Sci.* 93, 4919-4924.
48. Lamango, N., Zhu, X., and **Lindberg, I.** (1996) Purification and enzymatic characterization of recombinant PC2: stimulation of activity by 21 kDa 7B2. *Arch. Biochem. Biophysics* 330, 238-250.

49. Zhu, X., Lamango, N.S., and **Lindberg, I.** (1996) Involvement of a polyproline helix-like structure in the interaction of 7B2 with prohormone convertase 2. *J. Biol. Chem.* 271, 23582-23587.
50. Johannng, K., Mathis, J.P., and **Lindberg, I.** (1996) Processing site blockade results in more efficient conversion of proenkephalin to active opioid peptides. *J. Biol. Chem.* 271, 27871-27878.
51. Muller, L., Zhu, X., and **Lindberg, I.** (1997) Mechanism of facilitation of PC2 maturation by 7B2: involvement in PC2 transport and activation, but not folding. *J. Cell. Biol.* 139, 625-638.
52. Zhu, X., Muller, L., Mains, R.E. and **Lindberg, I.** (1998) Structural elements of PC2 required for its interaction with its helper protein 7B2. *J. Biol. Chem.* 273, 829-836.
53. Day, R., Lazure, C., Basak, A. Boudreault, A., Limperis, P., Dong, W., and **Lindberg I.** (1998) Prodynorphin processing by proprotein convertase 2 (PC2): cleavage at single basic residues and enhanced processing in the presence of carboxypeptidase. *J. Biol. Chem.* 273, 1153- 1164.
54. **Lindberg, I.**, Tu, B., Muller, L., and Dickerson, I. (1998) Cloning and functional analysis of *C. elegans* 7B2. *DNA and Cell Biol.* 17, 727-734.
55. Apletalina, E., Appel, J., Lamango, N.S., Houghten, R., and **Lindberg, I.** (1998) Identification of potent inhibitors of prohormone convertases 1 and 2 using a peptide combinatorial library. *J. Biol. Chem.* 273, 26589-26595.
56. Johannng, K., Juliano, M.A., Juliano, L., Lazure, C., Lamango, N., Steiner, D.F., and **Lindberg, I.** (1998) Specificity of prohormone convertase 2 on proenkephalin and proenkephalin-related fluorogenic peptides. *J. Biol. Chem.* 273, 22672-22680.
57. Lamango, N.S., Apletalina, E., Liu, J., and **Lindberg, I.** (1999) Conversion of proPC2 is a pH-driven process. *Arch. Biochem. Biophys.* 362, 275-282.
58. Westphal, C.H., Muller, L., Zhou, A., Zhu, X., , Bonner-Fraser, S., Schambelan, M., Steiner, D.F., **Lindberg, I.\***, and Leder, P.\* (1999) The neuroendocrine protein 7B2 is required for peptide hormone processing *in vivo* and provides a novel mechanism for pituitary Cushing's disease. *Cell* 96, 689-700. (\*co-senior authors)
59. Muller, L., Zhu, P. Juliano, M.A., Juliano, L., and **Lindberg, I.** (1999) A 36-residue peptide contains all of the information required for 7B2-mediated activation of proPC2. *J. Biol. Chem.* 274, 21471-21477.
60. Fortenberry, Y., Liu, J., and **Lindberg, I.** (1999) The role of the CT peptide in the inhibition of PC2 *in vivo*. *J. Neurochemistr*, 73, 994-1003.
61. Apletalina, E., Juliano, M. A., Juliano, L. and **Lindberg, I.** (2000) Structure-function analysis of the 7B2 CT peptide: mechanism of inhibition of PC2. *Biochem. Biophys. Res. Commun.* 267, 940-942.
62. Apletalina, E., Muller, L., and **Lindberg, I.** (2000) Mutations in the catalytic domain of prohormone convertase 2 result in loss of binding to 7B2 and inhibition with 7B2 CT peptide. *J. Biol. Chem.* 275, 14667-14677.
63. Hwang, J.R., Siekhaus, D., Fuller, R.S., Taghert, P., and **Lindberg, I.** (2000) Characterization of prohormone convertase 2 and 7B2 from *Drosophila melanogaster*. *J. Biol. Chem.* 275, 17886-17893.
64. Cameron, A., Fortenberry, Y., and **Lindberg, I.** (2000) The SAAS granin exhibits functional homology to 7B2 and contains a highly potent hexapeptide inhibitor against PC1. *FEBS Lett.* 473, 135-138.
65. Cameron, A., Appel, J., Houghten, R.A. and **Lindberg, I.** (2000) Polyarginines are potent furin inhibitors. *J. Biol. Chem.* 275, 36741-36749.
66. Muller, L.\*, Cameron, A.\*, Apletalina, E., Fortenberry, Y. and **Lindberg, I.** (2000) Processing and sorting of the prohormone convertase 2 propeptide. *J. Biol. Chem.* 275, 39213- 39222. (\*these authors contributed equally to the work)
67. Sayah, M., Fortenberry, Y., Cameron, A., and **Lindberg, I.** (2001) Distribution and enzymatic generation of proSAAS-derived peptides. *J. Neurochem.* 76, 1833-1841.

68. Hwang, J.R, and **Lindberg, I.** (2001) Inactivation of the 7B2 inhibitory CT peptide depends on a functional furin cleavage site. *J. Neurochem.* 79, 437-44.
69. Zachariah, C., Cameron, A., **Lindberg, I.**, Kao, K.J., Beinfeld, M., and Edison, A. (2001) Structural studies of a neuropeptide precursor protein with an RGD proteolytic site. *Biochemistry* 40, 8790-8799.
70. Rehfeld, J.F., **Lindberg, I.**, Friis-Hansen, L. (2002) Progastrin-derived peptides differ in 7B2 and PC2 knockout animals: a role for 7B2 independent of action on PC2. *FEBS Lett.* 510, pp. 89-9382.
71. Fortenberry, Y., Hwang, J.R., Apletalina, E.V., **Lindberg, I.** (2002) Functional characterization of proSAAS: similarities and differences with 7B2. *J. Biol. Chem.* 277, 5175-5186.
72. Sarac, M., Windeatt, S., Castro, M., and **Lindberg, I.** (2002) Adenoviral administration of 7B2 reverses endocrinological deficiencies in 7B2 null mice. *Endocrinology* 143, 2314-23.
73. Sarac, M., Zieske, A.W., and **Lindberg, I.** (2002). The lethal form of Cushing's in 7B2 null mice is due to multiple metabolic and hormonal abnormalities. *Endocrinology*, 143, 2324-32.
74. Laurent, V., Kimble, A., Peng, B., Zhu, P., Pintar, J., Steiner, D.F. and **Lindberg, I.** (2002) Mortality in 7B2 null mice can be rescued by adrenalectomy: involvement of dopamine in ACTH hypersecretion. *Proc. Natl. Acad. Sci. USA* 99, 3087.
75. Zhu, X., Zhou, A., Dey, A., Norrbom, C., Carroll, R., Zhang C., Laurent V., **Lindberg, I.**, Ugleholdt, R., Holst, J.J., Steiner, D.F. (2002) Disruption of PC1/3 expression in mice causes dwarfism and multiple neuroendocrine peptide processing defects. *Proc. Natl. Acad. Sci. USA* 99, 10293-10298.
76. Laurent, V., and **Lindberg, I.** (2002) Mini-RIA: adaptation of conventional [<sup>125</sup>I] radioimmunoassay to a 96-tube format. *Analytical Biochemistry* 309, 143-149.
77. Sarac, M.S., Cameron, A., **Lindberg, I.** (2002) The furin inhibitor hexa- D-arginine blocks the activation of *Pseudomonas aeruginosa* exotoxin A *in vivo*. *Infection and Immunity* 70, 7136-7139.
78. Laslop, A., Becker, A., **Lindberg, I.**, Fischer-Colbrie, R. (2002) Proteolytic processing of chromogranins is modified in brains of transgenic mice. *Ann N. Y. Acad. Sci.* 971, 49-52.
79. Li, Q.L., Naqvi, L., **Lindberg, I.** and Friedman, T.C. (2003) Prohormone convertase 2 (PC2) enzymatic activity and its regulation in endocrine cells. *Regul. Pept.* 110, 197-205.
80. Rehfeld, J.F., **Lindberg, I.** and Friis-Hansen, L. (2003) Increased synthesis but decreased processing of neuronal proCCK in PC2 and 7B2 knockout animals. *J. Neurochem.* 83, 1329-37.
81. Cornwall, G.A, Cameron, A., **Lindberg, I.**, Hardy, D.M., and Hsia, N. (2003) CRES inhibits the serine protease prohormone convertase 2. *Endocrinology* 144, 901-8.
82. Henrich, S., Cameron, A., Bourenkov, G.P., Kiefersauer, R., Huber, R., **Lindberg, I.**, Bode, W., and Than, M.E. (2003) The crystal structure of the proprotein processing proteinase furin explains its stringent specificity. *Nature Structural Biology* 10, 520-526.
83. Peinado, J.R., Li, H., Johannig, K., and **Lindberg, I.** (2003) Cleavage of recombinant proenkephalin and blockade mutants by prohormone convertases 1 and 2: an *in vitro* specificity study. *J. Neurochem.* 87, 868-78.
84. Winsky-Sommerer, R., Grouselle, D., Rougeot, C., Laurent, V., David, J.P., Delacourte, A., Dournaud, P., Seidah, N.G., **Lindberg, I.**, Trottier, S., and Epelbaum, J. (2003) The proprotein convertase PC2 is involved in the maturation of prosomatostatin to somatostatin-14 but not in the somatostatin deficit in Alzheimer's disease. *Neuroscience* 122, 437-47.
85. Laurent, V., Jaubert-Miazza, L., Desjardins, R., Day, R., and **Lindberg, I.** (2004) Biosynthesis of POMC-derived peptides in prohormone convertase 2 and 7B2 null mice. *Endocrinology*, 145, 519-28.
86. Sarac, M.S., Peinado, J.R., Leppla, S.H., and **Lindberg, I.** (2004) Protection against anthrax toxemia by hexa-D-arginine *in vitro* and *in vivo*. *Infection and Immunity* 72, 602-605.

87. Kacprzak, M., Peinado, J.R., Than, M., Appel, J., Henrich, S., Bode, W., Houghten, R.A., and **Lindberg, I.** (2004) Inhibition of furin by polyarginine-containing peptides: nanomolar inhibition by nona-D-arginine. *J. Biol. Chem.* 279, 36788-94
88. Lee S.N., Prodhomme, E., and **Lindberg, I.** (2004) Prohormone convertase 1 (PC1) processing and sorting: effect of PC1 propeptide and proSAAS. *J. Endocrinol.* 182, 353-364.
89. Peinado, J.R., Kacprzak, M., Leppä, S.H. and **Lindberg, I.** (2004) Cross-inhibition between furin and lethal factor inhibitors. *FEBS Lett.* 321, 601-605.
90. Henrich, S. **Lindberg, I.**, Bode, W., and Than, M.E. (2004) Proprotein convertase models based on the crystal structures of furin and kexin: explanation of their specificity. *J. Biomol. Structure* 345, 211-27.
91. Peinado, J.R.\*, Laurent, V.\*, Lee, S.N., Peng, B.W., Pintar, J.E., Steiner, D.F. and **Lindberg, I.** (2005) Strain-dependent influences on the hypothalamo-pituitary-adrenal axis profoundly affect the 7B2 null phenotype. (\**co-first authors*) *Endocrinology* 146, 3438-44.
92. Kacprzak, M.M., Than, M.E, Juliano, L., Juliano, M.A., Bode, W., and **Lindberg, I.** (2005) Mutagenesis of the PC2 substrate binding pocket alters enzyme specificity. *J. Biol. Chem.* 280, 31850-8.
93. Shiryayev, S.A, Ratnikov, B.I, Chekanov, A.V., Sikora, S., Rozanov, D.V., Godzik, A., Wang, J., Smith, J.W., Huang, Z., **Lindberg, I.**, Samuel, M.A., Diamond, M.S., Strongin, A.Y. (2005) The cleavage targets and the (D)-arginine-based inhibitors of the West Nile virus NS3 processing proteinase. *Biochemistry* 393, 503-11.
94. **Lindberg, I.** (2005) Balancing risk and recovery. *Science* 310, 972.
95. Lee, S.N., Hwang, J.R., and **Lindberg, I.** (2006) The neuroendocrine protein 7B2 can be inactivated by phosphorylation within the secretory pathway. *J. Biol. Chem.* 281, 3312-20.
96. Ozawa A., Cai, Y., and **Lindberg I.** (2007) Production of bioactive peptides in an *in vitro* system. *Analytical Biochem.* 366:182-9.
97. Lee, S.N., Peng, B., Desjardins, R., Pintar, J.E., Day, R., and **Lindberg, I.** (2007) Strain-specific steroidal control of pituitary function. *J. Endocrinol.* 192: 515-25.
98. Fugere, M., Appel, J., Houghten, R.A., **Lindberg, I.**, and Day, R. (2007) Short polybasic peptide sequences are potent inhibitors of PC5/6 and PC7: use of PS-SPCL as a tool for the optimization of inhibitory sequences. *Molecular Pharmacology* 71, 323-332.
99. Lee, S.N., Kacprzak, M.M., Day, R., and **Lindberg I.** (2007) Processing and trafficking of a prohormone convertase 2 active site mutant. *Biochem Biophys Res Commun.* 355, 825-9.
100. Waha, A., Koch, A., Hartmann, W., Milde, U., Felsberg, J., Hübner, A., Mikeska, T., Goodyer, C.G., Sörensen, N., **Lindberg, I.**, Wiestler, O.D., Pietsch, T, Waha, A. (2007) SGNE1/7B2 is epigenetically altered and transcriptionally downregulated in human medulloblastomas. *Oncogene* 26: 5662-8.
101. Lee, S.N. and **Lindberg, I.** (2008) 7B2 prevents unfolding and aggregation of prohormone convertase 2. *Endocrinology* 149: 4116-27.
102. Farber, C.R., Chitwood, J., Lee, S.N., Verdugo, R., Islas-Trejo, Rincon, A.G., **Lindberg, I.** and Medrano, J.F. (2008) Overexpression of *Scg5* increases enzymatic activity of *Pcsk2* and is negatively correlated with weight gain in congenic mouse models. *BMC Genet.* 9:34.
103. Kudo, H., Liu, J., Roubos, E., Ozawa, A., Panula, P. Martens, G.J.M., and **Lindberg, I.** (2009) Identification of proSAAS homologs in lower vertebrates: conservation of hydrophobic helices and convertase-inhibiting sequences. *Endocrinology* 150:1393-9.
104. Kowalska, D., Liu, J., Appel, J.R., Ozawa, A., Nefzi, A., Mackin, R.B., Houghten, R.A., and **Lindberg, I.** (2009) Synthetic small molecule prohormone convertase 2 inhibitors. *Molecular Pharmacology* 75: 617-25.
105. Ozawa, A., Speaker, R.B., and **Lindberg, I.** (2009) Enzymatic characterization of an HEL cell acyltransferase activity. *PLoS One* 4(5):e5426.

106. Izidoro, M.A., Gouvea, I.E., Santos, J.A., Assis, D.M., Oliveira, V., Judice, W.A., Juliano, M.A., **Lindberg, I.**, and Juliano, L. (2009) A study of human furin specificity using synthetic peptides derived from natural substrates: effects of potassium ions. *Arch. Biochem. Biophys.* **487**:105-14.
107. Becker, G.L., Sielaff, F., Than, M.E., **Lindberg I.**, Routhier, S., Day, R., Lu, Y., Garten, W., and Steinmetzer, T. (2009) Potent inhibitors of furin and furin-like proprotein convertases containing decarboxylated P1 arginine mimetics. *J. Med Chem.* **53**: 1067-75.
108. Izidoro, M.A., Assis, D.A., Oliveira, V., Santos, J.A.N, Juliano, M.A., **Lindberg, I.**, and Juliano, L. (2010) Effect of magnesium ions on recombinant human furin: selective activation of hydrolysis of substrates derived from virus envelope glycoproteins. *Biol. Chem.* **391**: 1105-12.
109. Ozawa, A., Peinado, J.R., and **Lindberg, I.** (2010) Modulation of prohormone convertase 1/3 properties using site-directed mutagenesis. *Endocrinology* **151**: 4437-45.
110. Hoshino, A., Kowalska, D., Jean, F., Lazure, C., and **Lindberg, I.** (2011) Modulation of PC1/3 activity by self-interaction and substrate binding. *Endocrinology*, **152**:1402-11 PMID:21303942 PMCID: PMC3060626
111. Sielaff, F., Than, M.E., Bevec, D., **Lindberg, I.**, and Steinmetzer, T. (2011) New furin inhibitors based on weakly basic amidinohydrazones. *Bioorg. Med. Chem. Lett.* **21**: 836-40.
112. Ozawa, A. Lick, A.N, and **Lindberg, I.** (2011) Processing of augurin is required to suppress proliferation of tumor cell lines. *Mol. Endocrinol.* **25**:776-84. PMID: 21436262
113. Helwig, M., Vivoli, M., Fricker, L.D., and **Lindberg I.** (2011) Regulation of neuropeptide processing enzymes by catecholamines in endocrine cells. *Mol. Pharmacol.* **80**:304-13. PMID: 21540292
114. Helwig, M., Lee, S-N., Hwang, J.R., Ozawa, A., Medrano, J.F., and **Lindberg, I.** (2011) Dynamic modulation of PC2-mediated precursor processing by 7B2. *J. Biol. Chem.* **286**:42504-13. PMID: 22013069
115. Kuester, M., Becker, G.L., Hards, K., **Lindberg, I.**, Steinmetzer, T., Than, M.E. (2011) Purification of the proprotein convertase furin by affinity chromatography based on PC-specific inhibitors. *Biol Chem.* **392**: 973-81. PMID:21875402 PMCID: PMC3791315
116. Toll, L., Khroyan, T.V., Sonmez, K., Ozawa, A., **Lindberg, I.**, McLaughlin, J.P, Eans, S.O., Shahien, A.A, and Kapusta, D.R. (2012) Peptides derived from the prohormone proNPQ/Spexin are potent central modulators of cardiovascular and renal function and nociception. *FASEB J.* **26**(2):947-54. PMID: 22038051
117. Vivoli, M., Caulfield, T.R., Martínez-Mayorga, K., Johnson, A.T., Jiao, G.-S. and **Lindberg, I.** (2012) Inhibition of PC1/3 and PC2 by 2,5-dideoxystreptamine derivatives. *Mol. Pharmacol.* **81**(3):440-54. PMID: 22169851
118. Becker, G.L., Lu Y., Hards, K., Strehlow, B., Levesque, C., **Lindberg, I.**, Sandvig, K., Bakowsky, U., Day, R., Garten, W., and Steinmetzer, T. (2012) Highly potent inhibitors of the proprotein convertase furin as potential drugs for the treatment of infectious diseases. *J. Biol. Chem.* **287**(26):21992-2003
119. Yuan B., Feng J.Q., Bowman, S., Ying, L., Blank, R.D., **Lindberg, I.**, and Drezner, M.K. (2012) Hexa-D-Arginine treatment increases 7B2-PC2 activity in *hyp* mouse osteoblasts and rescues the *hyp* phenotype. *J. Bone and Mineral Res* **28**(1):56-72. PMID: 22886699
120. Dasgupta, I.\*, Sanglas, L.\*, Enghild, J. and **Lindberg I.** (2012) The neuroendocrine protein 7B2 is an intrinsically disordered protein. (\*co-first authors) *Biochemistry* **51**(38):7456-64. PMID:22947085
121. Zhu, J., Declercq, J., Roucourt, B., Ghassabeh, G.H., Meulemans, S., Kinne, J., David, G., Vermorcken, A.J., Van de Ven, W.J., **Lindberg, I.**, Muyltermans, S., and Creemers, J.W. (2012) Generation and characterization of non-competitive furin-inhibiting nanobodies. *Biochem. J.* **448**(1):73-82. PMID: 22920187

122. Pickett, L.A., Yourshaw, M., Chen, Z., Solorzano-Vargas, R.S., Nelson, S.F., Martín, M.G., and **Lindberg, I.** (2013) Functional consequences of a novel variant of *PCSK1*. *PLoS One* 8(1):e55065. doi: 10.1371/journal.pone.0055065. PMID: 23383060; PMCID: PMC3557230
123. Helwig, M., Hoshino, A., Berridge, C., Lee, S.N., Lorenzen, N., Otzen, D., Eriksen, J., and **Lindberg, I.** (2013) The neuroendocrine protein 7B2 suppresses neurodegenerative disease-related protein aggregation. *J. Biol. Chem.* 288:1114–1124. PMID: 23172224 PMCID: PMC3542996
124. Yongye, A.B., Vivoli, M., **Lindberg, I.**, Appel, J.R., Houghten, R.A., Martinez-Mayorga, K. (2013) Identification of a small molecule that selectively inhibits mouse PC2 over mouse PC1/3: A computational and experimental study. *PLoS One* 2013;8(2):e56957. PMID:23451118
125. Martín, M.G., **Lindberg, I.**, Solorzano-Vargas, R.S., Wang, J., Avitzur, Y., Bandsma, R., Sokollik, C., Lawrence, S., Pickett, L.A., Chen, Z., Egritas, O., Dalgic, B., Albornoz, V., de Ridder, L., Hulst, J., Gok, F., Aydoğan, A., Al-Hussaini, A., Gok, D.E., Yourshaw, M., Wu, S.V., Cortina, G., Stanford, S., and Georgia, S. (2013) Congenital proprotein convertase 1/3 deficiency causes malabsorptive diarrhea and other endocrinopathies in a pediatric cohort. *Gastroenterology* 45:138-48 PMCID:PMC3719133
126. Yourshaw, M., Solorzano-Vargas, R.S., Pickett, L.A., **Lindberg, I.**, Wang, J., Cortina, G., Baron, H., Nelson, S.F., and Martín, M.G. (2013) Exome sequencing finds a novel *PCSK1* mutation in a child with generalized malabsorptive diarrhea and diabetes insipidus. *J. Pediatric Gastroenterology & Nutrition.* 57:759-67. PMCID: PMC4170062
127. Peinado, J.R., Sami, F., Rajpurohit, N., and **Lindberg, I.** (2013) Blockade of islet amyloid polypeptide fibrillation and cytotoxicity by the secretory chaperones 7B2 and proSAAS. *FEBS Lett.*, Nov 1;587(21):3406-11 PMID: 24042052
128. Hoshino, A., Helwig, M., Rezaei, S., Berridge, C., Eriksen, J.L., and **Lindberg, I.** (2013) A novel function for proSAAS as an amyloid anti-aggregant in Alzheimer's disease. *J. Neurochem.* 128(3):419-30. PMID: 24102330 PMCID: PMC3946950
129. Prabhu, Y., Blanco, E.H., Liu, M., Peinado, J.R., Wheeler, M., Gekakis, N., Arvan, P. and **Lindberg, I.** (2014) Defective transport of the obesity mutant PC1/3 N222D contributes to loss of function. *Endocrinology* 155(7):2391-401 PMID: 24828610
130. Blanco, E.H., Peinado, J.R, Martin, M.G., and **Lindberg, I.** (2014) Biochemical and cell biological properties of the human prohormone convertase 1/3 Ser357Gly mutation: a PC1/3 hypermorph. *Endocrinology* 55(9):3434-47 PMID: 24932808
131. Liew, C.W., Assmann, A., Templin, A.T., Raum, J.C., Lipson, K.L., Rajan, S., Qiang, G., Hu, J., Kawamori, D., **Lindberg, I.**, Philipson, L.H., Sonenberg, N., Goldfine, A.B., Stoffers, D.A., Mirmira, R.G., Urano, F., and Kulkarni, R.N. (2014) Insulin regulates carboxypeptidase E by modulating translation initiation scaffolding protein eIF4G1 in pancreatic  $\beta$  cells. *Proc. Natl. Acad. Sci. USA.* 111(22):E2319-28. PMID: 24843127
132. **Lindberg, I.**, Pang, H.W., Stains, J.P., Clark, D., Yang, A.J., Bonewald, L., and Li, K.Z. (2014) FGF23 is endogenously phosphorylated in bone cells. *J. Bone Mineral Res.*, 30(3):449-54. PMID: 25195776
133. Wilschanski, M., Abbassi, M., Blanco, E., **Lindberg, I.**, Yourshaw, M., Zangen, D., Berger, I., Shteyer, E., Pappo, O., Baroz, B. Martín, M.G. and Elpeleg, O. (2014) A novel familial mutation in the *PCSK1* gene that alters the oxyanion hole residue of proprotein convertase 1/3 and impairs its enzymatic activity. *PLoS One* Oct 1;9(10):e108878 PMID:25272002
134. Ramos-Molina, B., and **Lindberg, I.** (2015) Phosphorylation and alternative splicing of 7B2 reduce prohormone convertase 2 activation. *Mol. Endocrinol.* 29:756-64. PMID:25811241
135. Hardes, K., Becker, G., Lu, Y., Dahms, S.O., Köhler, S., Beyer, W., Sandvig, K., Yamamoto, H., **Lindberg, I.**, Walz, L., von Messling, V., Than, M.E., Garten, W., and Steinmetzer, T. (2015) Novel furin inhibitors with potent anti-infectious activity. *ChemMedChem* 10:1218-31 PMID:25974265



136. Ramos-Molina, B., Lick, A. N., Blanco, E.H., Posada-Salgado, A., Martinez-Mayorga, K., Johnson, A.T., Jiao, G.S., and **Lindberg, I.** (2015) Identification of potent and compartment-selective small molecule furin inhibitors using cell-based assays. *Biochem. Pharmacol.* 96:107-18 PMID:26003844
137. Ramos-Molina, B., Lick, A.N., Shirazi, A.N., Oh, D., Tiwari, R., El-Sayed, N.S., Parang, K., and **Lindberg, I.** (2015) Cationic transfection reagents are potent furin inhibitors. *PLoS One* 10(6):e0130417. PMID: 26110264
138. Blanco, E.H., Ramos-Molina, B. and **Lindberg, I.** (2015) Revisiting PC1/3 mutants: dominant-negative effect of endoplasmic reticulum-retained mutants. *Endocrinology* 156:3625-37. PMID: 26207343
139. **Lindberg, I.**, Shorter, J., Wiseman, R.L., Chiti, F., Dickey, C.A., and McLean, P.J. (2015) Chaperones in neurodegeneration. *J. Neurosci.*, 35:13853-9. PMID: 26468185
140. Yamamoto, H., Ramos-Molina, B., Lick, A.N., Prideaux, M., Albornoz, V., Bonewald, L., and **Lindberg, I.** (2016) Posttranslational processing of FGF23 in osteocytes during the osteoblast to osteocyte transition. *Bone* 84:120-130. PMID: 26746780
141. Jarvela, T., Lam, H.A., Helwig, M., Lorenzen, N., Otzen, D.E., McLean, P.J., Maidment, N.T. and **Lindberg, I.** (2016) The neural chaperone proSAAS blocks  $\alpha$ -synuclein fibrillation and neurotoxicity. *Proc. Natl. Acad. Sci.* 9;113:E4708-15 PMID:27457957 PMCID:PMC4987805
142. Harges, K., Ivanova, T., Thaa, B., McInerney, G.M., Klock, T.I., Sandvig, K., Künzel, S., **Lindberg, I.**, and Steinmetzer, T. (2017) Elongated and shortened peptidomimetic inhibitors of the proprotein convertase furin. *ChemMedChem.* 12(8):613-620. PMID:28334511
143. Winters, A.\*, Ramos-Molina, B.\*, Jarvela, T.S., Yerges-Armstrong, L., Pollin, T.I., and **Lindberg, I.** (2017) Functional analysis of PCSK2 coding variants: a founder effect in the Old Order Amish population. *Diabetes Res. and Clinical Practice.* 131:82-90 \*Co-first authors. PMID:28719828
144. Katorcha, E., Makarava, N., Lee, Y.J., **Lindberg, I.**, Monteiro, M.J., Kovacs, G.G., and Baskakov, I.V. (2017) Cross-seeding of prions by aggregated  $\alpha$ -synuclein leads to transmissible spongiform encephalopathy. *PLoS Pathog.* 13(8): PMID: 28797122, PMCID:PMC5567908
145. Ivanova, T., Kallis, S., Than, M.E., Kunzel, S., Böttcher-Friebertshäuser, E., **Lindberg, I.**, Jiao, G.S., Bartenshlager, R., and Steinmetzer T. (2017) Optimization of substrate-analogue furin inhibitors. *ChemMedChem.* 12(23):1953-1968. PMID:29059503
146. Jarvela, T.S., Womack, T., Georgiou, P., Gould, T., Eriksen, J.L. and **Lindberg, I.** (2018) 7B2 chaperone knockout in APP model mice results in reduced plaque burden. *Sci Rep.* 8(1):9813. PMID: 29955078
147. Lam van, T.V., Ivanova, T., Harges, K., Heindl, M.R., Morty, R.E., Böttcher-Friebertshäuser, E., **Lindberg, I.**, Than, M.E., Dahms S.O., and Steinmetzer, T. (2019) Design, synthesis and characterization of new macrocyclic inhibitors of the proprotein convertase furin. *ChemMedChem.* Jan 25. doi: 10.1002/cmdc.201800807. PMID: 30680958
148. Jarvela, T.S., Surbhi, Shakya, M, Bachor, T., White, A., Low, M.J., and **Lindberg, I.** (2019) Reduced stability and pH-dependent activity of a common obesity-linked PCSK1 polymorphism, N221D. *In revision.*

### Reviews and Book Chapters

1. **Lindberg, I.** On the evolution of proenkephalin. (1986) *Trends in Pharmacol. Sci.* 7, 216-218.
2. **Lindberg, I.**, and Hutton, J. C. (1991) "Peptide processing proteinases with selectivity for paired basic amino acids" in *The Biosynthesis of Peptide Hormones and Neurotransmitters* (L.D. Fricker, Ed.) CRC Press, Boca Raton, FL.

3. **Lindberg, I.** (1991) The new mammalian precursor processing proteinases. *Mol. Endocrinol.* 5, 1361-1365.
4. **Lindberg, I.** and Zhou, Y. (1995) "Overexpression of neuropeptide precursors and processing enzymes" in "Peptidases and neuropeptide processing. *in Methods in Neuroscience*, Vol 23, 94-108. (A. Ian Smith, Ed.) Academic Press, Orlando, FL
5. **Lindberg, I.** (1996) "Polypeptide hormones: biosynthesis, processing, and secretion" *in The Encyclopedia of Molecular Biology*, VCH Press, Weinheim, Germany (R.A. Myers, Ed.)
6. Creemers, J.M.W., Bailyes, E.M., **Lindberg, I.**, and Hutton, J.C. (1999) "Proteolytic Processing" *in Protein Expression- A Practical Approach* (Eds. B.D. Hames and S.J. Higgins) Oxford University Press, Oxford, UK.
7. Muller, L., and **Lindberg, I.** (1999) "The cell biology of the prohormone convertases PC1 and PC2." *in Progress in Nucleic Acids Research* (K. Moldave, Ed.) Academic Press, San Diego, CA pp69-108
8. Murray, S., Coste, S., **Lindberg, I.** and Stenzel-Poore, M. (2001) "Genetic mutants with dysregulation of corticotropin pathways." *in Transgenic Models in Endocrinology* (M. Castro, Ed.)
9. Cameron, A., Apletalina, E. and **Lindberg, I.** (2001) The enzymology of prohormone convertases PC1 and PC2. *in The Enzymes* (R.E. Dalbey, Ed). Academic Press, San Diego, CA
10. Ozawa, A., **Lindberg, I.**, Roth, B.A., and Kroeze, W. (2010) Deorphanization of novel peptides and their receptors. *AAPS J.* 12:378-84.
11. **Lindberg, I.** and Appel, J. (2011) "Inhibitor screening of proprotein convertases using positional scanning libraries" *in Methods in Molecular Biology #768: Proprotein Convertases* (M. Mbikay, Ed). Springer Protocols, 768:155-66. PMID: 21805241
12. Vivoli, M. and **Lindberg, I.** (2012) "Prohormone convertase 1/3": *in Handbook of Biologically Active Peptides.* (A. Kastin, Ed). Academic Press.
13. Vivoli, M. and **Lindberg, I.** (2012) "Prohormone convertase 2": *in Handbook of Biologically Active Peptides.* (A. Kastin, Ed). Academic Press.
14. Hoshino A., and **Lindberg, I.** (2012) The biochemistry and cell biology of prohormone convertases 1/3 and 2. *in Neuropeptide Biosynthesis* (E-Book) L. Devi and L.D. Fricker, Eds. Morgan and Claypool Life Sciences Publishers.
15. Peinado, J.R. and **Lindberg, I.** (2015) Posttranslational modifications. *Encyclopedia of Cell Biology.* (Online Encyclopedia) G. Hart, Editor; Elsevier Press.
16. Ramos-Molina, B., Peinado J.R. and **Lindberg, I.** (2015) Regulated proteolysis of signaling molecules: the proprotein convertases. In series *Encyclopedia of Cell Biology* (Online Encyclopedia). J. Bond, Editor; Elsevier Press.
17. Ramos-Molina, B., Martin, M.G., and **Lindberg, I.** (2016) "PCSK1 variants and human obesity", vol. Genetics of Monogenic and Syndromic Obesity, in series *Progress in Molecular Biology and Translational Science.* P. Michael Conn, Ed.; Academic Press. PMID:27288825