NAME	POSITION TITLE
OVERALL, Christopher M.	Professor & Canada Research Chair in Metalloproteinase Proteomics and Systems Biology

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
The University of Adelaide, South Australia, Australia	BDS	1979	Dental Surgery
The University of Adelaide, South Australia, Australia	BSc (Hons)	1980	Immunology/Oral Biology
The University of Adelaide, South Australia, Australia	MDS	1985	Oral Biology
The University of Toronto, Ontario, Canada	PhD	1991	Biochemistry
The University of British Columbia, Canada *Faculty Medicine Protein Engineering Network of Centres of Excellence*		1989-1992	Postdoctoral M.R.C. Centennial Fellow

Short Biographical Sketch

Dr. Overall is a Professor and Tier 1 Canada Research Chair in Proteinase Proteomics and Systems Biology at the University of British Columbia, Centre for Blood Research. He completed his undergraduate, Honors Science and Masters degrees at the University of Adelaide, South Australia; his Ph.D. in Biochemistry at the University of Toronto; and was a MRC Centennial Fellow in his post-doctoral work with Dr. Michael Smith, Nobel Laureate, Biotechnology Laboratory, University of British Columbia. On Sabbatical in 1997-1998 he was a Visiting Senior Scientist at British Biotech Pharmaceuticals, Oxford, UK and in 2004/2008 he was a Visiting Senior Scientist at the Expert Protease Platform, Novartis Pharmaceuticals, Basel, Switzerland where he learned industrial scale concepts and the science of drug development. He was an External Senior Fellow, Freiburg Institute for Advanced Studies, Albert-Ludwigs Universität Freiburg, Germany and in 2014 was appointed as an Honorary Professor, Albert-Ludwigs Universität Freiburg. Dr. Overall won the Institute of Musculoskeletal Health and Arthritis CIHR Award as 2002 CIHR Scientist of the Year, the University of British Columbia Killam Senior Researcher Award (Science) 2005, and was the Chair of the 2003 Matrix Metalloproteinase Gordon Research Conference and the 2010 Protease Gordon Research Conference. He is a regular a plenary speaker at HUPO conferences and organized a featured symposium “Can proteomics fill the gap between genomics and phenotypes?” at the 2012 AAAS conference. With over 12,626 citations for his 201 papers (since 2000 his papers have been cited >8,813 times) and with an *h factor* of 62 he is a highly influential scientist in the field. Professor Overall is also the pioneer of *degradomics*, a term he coined. With 19 Nature Review, Nature Journal, Science and Science Signaling papers he is a leader in the field, which was recently recognized by the International Society of Proteolysis with a Lifetime Achievement Award in October 2011; by the Matrix Biology Society of Australia and New Zealand with the 2012 Barry Preston Award; in 2013 by the International Association of Dental Research Distinguished Scientist Award for Research in Oral Biology; and in 2014 by the Tony Pawson Canadian National Proteomics Network Award for Outstanding Contribution and Leadership to the Canadian Proteomics Community.

Selected Positions and Employment

1992-1997 Assistant Professor, University of British Columbia (UBC); 1992-1995 Clinician Scientist, Medical Research Council of Canada (MRC); 1995-present Associate Member, Department of Biochemistry & Molecular Biology, UBC; 1997-1998 Visiting Scientist, British Biotech, Oxford UK; 1999-2000 Canadian Institutes of Health Research Scientist; 2000-present Full Professor, UBC; 2001-2005 Member, Protein Engineering Network, Centres of Excellence; 2001-present Canada Research Chair (Tier I) in Metalloproteinase Proteomics & Systems Biology; 2002-present Associate Member, UBC Prostate Centre; 2002-present Member, UBC Centre for Blood Research; 2004-2005 Visiting Scientist, Protease Platform, Novartis, Basel, Switzerland; 2005-present External Consultant, Expert Protease Platform, Novartis; 2006-present Executive Member, B.C. Proteomics Network; 2008 Visiting Scientist, Novartis, Basel, Switzerland; 2010-12 External Senior Fellow, Freiburg Institute of Advanced Studies, Albert-Ludwigs University, Germany; 2013 Consultant, Genentech; Honorary Professor, Albert-Ludwigs-Universität Freiburg, Germany in 2013.

Selected Honors and Awards

1984-1989 Postdoctoral Fellowship, MRC; 1987 Edward H. Hatton Award, 1st Place Postdoctoral, International Association for Dental Research (IADR); 1988 Young Investigator Award, 3rd Int. Conference Chemistry & Biology Mineralized Tissues; 1989 William J. Gies Award, AADR for the best publication in 1988; 1989 Young Investigator Award, MMP Conference; 1989-1992 Centennial Fellowship (1st place), MRC; 1991 Young Investigator Award, IADR (for best scientist under 35 years); 1999 Scientist Award, MRC; 2001 Tier 1 Canada Research Chair in Metalloproteinase Proteomics & Systems Biology; **2002 CIHR Researcher of the Year**; 2003 CIHR Award for Research Excellence in Oral Health; 2003 Chairman, MMP Gordon Research Conference; 2004 Listed in the Contemporary Who's Who; 2005 Fellow, Canadian Academy of Health Sciences; 2005 International Proteolysis Society Council; 2006 Killam Award Research Prize, Senior Science Category, UBC; 2010 Chairman, Protease Gordon Research Conference; 2011 **Lifetime Achievement Award,** International Proteolysis Society; 2012 Barry Preston Award (**Lifetime Achievement Award in Matrix Biology**) Matrix Biology Society Australia & NZ; 2013 **Distinguished Scientist Award**, IADR; 2014 the **Tony Pawson Award** for Outstanding Contribution and Leadership to the Canadian Proteomics Community.

Research Areas

Proteomics, degradomics, Human Proteome Project, proteases, MMPs, extracellular matrix biology, anti-viral immunity, innate immunity

Linkedin

Selected peer-reviewed publications *49 papers in past three years; 77 since 2009, career total 203.*

1. Marchant, D., Bellac, C., Wadsworth, S., Dufour, A., Butler, G.S., Cheung, C., Ng, J., Luo, Z., Garmaroudi, F.S., Heilbron, K., Karpov, A., Devel, L., Georgiadis, D., Hegele, R.G., Luo, H., Dive, V., McManus, B.M., **Overall, C.M.** 2014. Transcriptional Upregulation of IκBα by a Moonlighting Extracellular Metalloprotease is Essential for Antiviral Immunity. **Nature Medicine 20, 493-502,** doi 10.1038/nm.3508.
2. Fortelny N, Cox JH, Kappelhoff R. Starr AE, Lange PF, Pavlidis P, **Overall CM** 2014. Network Analyses Reveal Pervasive Functional Regulation Between Proteases in the Protease Web. **PLoS Biology,** *In press*.
3. Lange, P., Huesgen, P.F., Nguyen, K., and **Overall, C.M.** 2014. Annotating N termini for the Human Proteome Project: N termini and Nα-acetylation Status Differentiate Stable Cleaved Protein Species from Degradation Remnants in the Human Erythrocyte Proteome. **Journal of Proteomics Research 13,** 2028–44
4. auf dem Keller, U., Prudova, A., Eckhard, U., Fingleton, B., and **Overall, C.M.** 2013. Systems-Level Analysis of Proteolytic Events in Increased Vascular Permeability and Complement Activation in Skin Inflammation. **Science Signaling 6,** rs2, 1-15*:* DOI: 10.1126/scisignal.2003512.
5. Dufour, A. and **Overall, C.M.** 2013. Missing the Target: Matrix Metalloproteinase Anti-Targets in Inflammation and Cancer. **Trends in Pharmacological Sciences 34,** 233-242**.** *Invited Review (Cover).*
6. Lange, P. and **Overall, C.M.** 2013. The TAILS of Proteins: Protein Termini Tell Tales of Proteolysis and Protein Function. **Current Opinion in Chemical Biology 17,** 73-82. Edited by Bogyo, M. and Rudd, P. Published by Elsevier (Amsterdam, Netherlands) http://dx.doi.org/10.1016/ j.cbpa.2012.11.025.
7. Wilson, C.H., Indarto, D., Doucet, A., Pogson, L.D., Pitman, M.R., McNicholas, K., Menz, R.I., **Overall, C.M.***, and Abbott, C.A.* 2013. Identifying Natural Substrates for Dipeptidyl Peptidases 8 and 9 using Terminal Amine Isotopic Labeling of Substrates (TAILS) Reveals *in Vivo* Roles in Cellular Homeostasis and Energy Metabolism. * *Joint Senior Authors.* **Journal of Biological Chemistry 288,** 13,936-13,949. *Paper of the Week*. ***Selected by the Faculty of 1000 Biology for its significance.***
8. Broder, C., Arnold, P., Vadon-Le Goff, S., Konerding, M., Bahr, K., Müller, S., **Overall, C.M.**, Bond, J.S., Koudelka, T., Tholey, A., Hulmes, D.J., Moali, C., Becker-Pauly, C. 2013. Metalloproteases Meprin α and Meprin β are C- and N-Procollagen Proteinases Important for Collagen Assembly and Tensile Strength. **Proceedings National Academy of Sciences (U.S.A.) 110,**14219-14224.
9. Lange, P., Huesgen, P. and **Overall, C.M.** 2012. TopFIND 2.0—Linking Protein Termini with Proteolytic Processing and Modifications Altering Protein Function. **Nucleic Acids Research,** 40, D351-61.

10. Starr, A.E., Dufour, A., Maier, J., and **Overall, C.M.** 2012. Biochemical Analysis of Matrix Metalloproteinase Activation of Chemokines CCL15 and CCL23 and Increased Glycosaminoglycan Binding of CCL16. **Journal of Biological Chemistry 287,** 5,848-5,860.
11. Starr, A.E, Bellac, C.L, Dufour, A., Goebeler, V., and **Overall, C.M.** 2012. Biochemical Characterization and N-Terminomics Analysis of Leukolysin, the Membrane-Type 6 Matrix Metalloproteinase (MMP25): Chemokine and Vimentin Cleavages Enhance Cell Migration and Macrophage Phagocytic Activities. **Journal of Biological Chemistry 287,** 13382-13395.
12. Lange, P. and **Overall, C.M.** 2011. TopFIND, a Knowledgebase Linking Protein Termini with Function. **Nature Methods 8,** 703-704.
13. Kleifeld, O., Doucet, A., Prudova, A., auf dem Keller, U., Gioia, M., Kizhakkedathu, J., and **Overall, C.M.** 2011. System-Wide Proteomic Identification of Protease Cleavage Products by Terminal Amine Isotopic Labeling of Substrates. **Nature Protocols 6,** 1578-1611.
14. Schilling, O., Huesgen, P.F., Barré, O., auf dem Keller, U., and **Overall, C.M.** 2011. Characterization of the Prime and Non-Prime Active Site Specificities of Proteases by Proteome-derived Peptide Libraries and Tandem Mass Spectrometry. **Nature Protocols 6,** 111-120.
15. Morrison, C.J., Mancini, S., Kappelhoff, R., Cipollone, J., Roskelley C., and **Overall, C.M.** 2011. Microarray and Proteomic Analysis of Breast Cancer Cell and Osteoblast Co-cultures: The Role of Osteoblast Matrix Metalloproteinase (MMP)-13 in Bone Metastasis. **Journal of Biological Chemistry 286,** 34,271-34,285.
16. Doucet, A., and **Overall, C.M.** 2011. Broad Coverage Identification of Multiple Proteolytic Cleavage Sites Using Proteomics as a Complement to Edman Sequencing. **Mol Cell Proteomics 10,** M110.003533 1-12.
17. Becker-Pauly, C., Barré, O., Schilling, O., auf dem Keller, U., Broder, C., Schütte, A., Kappelhoff, R., Stöcker, W. **Overall, C.M.** 2011. Proteomic Analyses Reveal an Acidic Prime Side Specificity for the Astacin Metalloprotease Family Reflected by Physiological Substrates. **Mol Cell Proteomics 10,** M111.009233 1-19.
18. Schilling, O., Barré, O., Huesgen, P.F., and **Overall, C.M.** 2010. Proteome-wide Analysis of Protein Carboxy Termini: C Terminomics. **Nature Methods 7,** 508-511. *Featured in C&EN*.
19. Kleifeld, O., Doucet, A., auf dem Keller, U., Prudova, A., Schilling, O., Kainthan, R.K., Starr, A., Foster, L.J., Kizhakkedathu, J.N., and **Overall, C.M.** 2010. Isotopic labeling of Terminal Amines in Complex Samples Identifies Protein N-termini and Protease Cleavage Products. **Nature Biotechnology 28,** 281-288.
20. auf dem Keller, U., Bellac, C., Li, Y., Lou, Y., Lange, P., Ting, R., Harwig, C., Kappelhoff, R., Dedhar, S., Adam, M., Ruth, T.J., Bernard, F., Perrin, D., **Overall, C.M.** 2010. Novel MMP Inhibitors: [^{18}F]-Marimastat-Aryltrifluoroborate as a Probe for *in vivo* PET Imaging in Cancer. **Cancer Research 70,** 7,562-7,569.
21. Prudova, A., auf dem Keller, U., Butler, G.A., and **Overall, C.M.** 2010. Multiplex N-Terminome Analysis of MMP-2 and MMP-9 Degradomes by iTRAQ-TAILS Quantitative Proteomics. **Mol Cell Proteomics 9,** 894-911. Cox, J.H., Starr, A.E., Kappelhoff, R., Yan, R., Roberts, C.R., **Overall, C.M.** 2010. Matrix Metalloproteinase-8 Deficiency Exacerbates Inflammatory Arthritis Through Delayed Neutrophil Apoptosis and Reduced Caspase-11 Expression. **Arthritis and Rheumatism 62,** 3,645-3,655*. Editorial Highlighted.*
22. auf dem Keller, U., Prudova, A., Gioia, M., Butler, G.S., and **Overall, C.M.** 2010. Quantitative N-Terminome Analysis and Identification of Protease Cleavage Products. **Mol Cell Proteomics 9,** 912-27.
23. Butler, G.S. and **Overall, C.M.** 2009. Proteomic Identification of Multitasking Proteins in Unexpected Locations Complicates Drug Targeting. **Nature Reviews Drug Discovery 8,** 935-948. *Featured Cover*.
24. Schilling, O. and **Overall, C.M.** 2008. Proteome-derived Database Searchable Peptide Libraries for Identifying Protease Cleavage Sites. **Nature Biotechnology 26,** 685-694.
25. Doucet, A., Butler, G.S., Rodríguez, D., Prudova, A., and **Overall, C.M.** 2008. Metadegradomics: Towards Quantitative Degradomics of Proteolytic Post-Translational Modifications of the Cancer Secretome. **Molecular Cellular Proteomics 7,** 1925-1951.
26. Dean, R.A., Cox, J.H., Bellac, C.L., Doucet, A., Starr, A.E., and **Overall, C.M.** (2008). Macrophage-specific Metalloelastase (MMP-12) Truncates and Inactivates ELR$^+$ CXC Chemokines and Generates CCL2, 7, 8, and 13 Antagonists: Potential Role of the Macrophage in Terminating PMN Influx. **Blood 112,** 3444-3453.

27. **Overall, C.M.** and Blobel, C.P. 2007. In Search of Partners: Linking Extracellular Proteases to Substrates. **Nature Reviews Molecular Cell Biology 8,** 245-257.
28. Wolf, K., Wu, Y.I., Liu, Y., Geiger, J., Tam, E., **Overall, C.M.**, Stack, M.S., Friedl, P. 2007. Pericellular Proteolysis Controls for the Transition from Individual to Cancer Cell Invasion. **Nature Cell Biology 9,** 893-04.
29. Dean, R.A. and **Overall, C.M.** 2007. Proteomic Discovery of Metalloprotease Substrates in the Cellular Context by iTRAQ Labeling Reveals A Diverse MMP-2 Substrate Degradome. **Mol Cell Proteomics 6,** 611-623.
30. Dean, R.A., Butler, G.S., Hamma-Kourbali, Y., Delbé, J., Brigstock, D.R., Courty, J., and **Overall, C.M.** 2007. Identification of Candidate Angiogenic Factors Processed by Matrix Metalloproteinase-2 (MMP-2) in Cell-Based Proteomic Screens: Disruption of Vascular Endothelial Growth Factor (VEGF)/ Heparin Affin Regulatory Peptide (Pleiotrophin) and VEGF/Connective Tissue Growth Factor Angiogenic Inhibitory Complexes by MMP-2 Proteolysis. **Molecular Cellular Biology 27,** 8454-8465.
31. **Overall, C.M.** and Kleifeld, O. 2006. Validating MMPs as Drug Targets and Anti-targets for Cancer Therapy. **Nature Reviews Cancer 6,** 227-239.
32. Tam, E.M., Morrison, C.M., Wu, Y., Stack, S., and **Overall, C.M.** 2004. Membrane Protease Proteomics: Isotope Coded Affinity Tag/Tandem Mass Spectrometry Identification of Undescribed MT1-MMP Substrates, **Proceedings National Academy of Sciences U.S.A. 101,** 6917-6922.
33. Puente, X.S., Sanchez, L.M., **Overall, C.M.**, and López-Otín, C. 2003. Human and Mouse Proteases: A Comparative Genomic Approach. **Nature Reviews Genetics 4,** 544-558.
34. Zhang, K., McQuibban, G.S., Silva, C., Butler, G.S., Johnston, J.B., Holden, J., Clark-Lewis, I., **Overall, C.M.***, and Power, C.* 2003. HIV-Induced Metalloproteinase Processing of the Chemokine Stromal Cell Derived Factor-1 Causes Neurodegeneration. *(*Joint Senior Authors)* **Nature Neuroscience 6,** 1064-71.
35. Balbín, M., Fueyo, A., Tester, A.M., Pendás, A. M., Pitiot, A.S., Astudillo, A., **Overall, C.M.**, Shapiro, S. and López-Otín, C. 2003. Loss of Collagenase-2 Confers Increased Skin Tumor Susceptibility to Male Mice. **Nature Genetics 35,** 252-257.
36. López-Otín, C. and **Overall, C.M**. 2002. Protease Degradomics: A New Challenge for Proteomics. Invited Review. **Nature Reviews Molecular Cell Biology** 3, 509-519.
37. **Overall, C.M.** and López-Otín, C. 2002. Strategies for MMP Inhibition in Cancer: Innovations for the Post-Trial Era. *Invited Review.* **Nature Reviews Cancer 2,** 657-672.
38. McQuibban, G.A., Gong, J.-H., Tam, E., McCulloch, C.A.G., Clark-Lewis, I., and **Overall, C.M.** 2000. Inflammation Dampened by Cleavage of Monocyte Chemoattractant Protein-3. **Science 289,** 1202-06.