Personal details

Name:	Steven H. L. Verhelst
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Website:	www.wzw.tum.de/verhelst

Education

2004 – 2008	Post-doctoral training (chemical biology), Stanford University, School of Medicine (California, USA).
1999 – 2004	PhD (bio-organic chemistry), Leiden University (Leiden, The Netherlands).
1994 – 1999	M.Sc. (chemistry), *cum laude**, Leiden University (Leiden, The Netherlands). *In the Netherlands, *cum laude* represents approximately the best 5-10% of students.

Research/professional experience

2008 – present	Emmy Noether group leader, Technical University Munich, Chair for Chemistry of Biopolymers. Laboratory interests: chemical proteomics approaches in the study of proteases.
2004 – 2008	Post-doctoral fellow at the Department of Pathology of the Stanford University School of Medicine in the group of Dr. M. Bogyo. Research project: the development of small molecule tools for chemical proteomics, focused on cysteine proteases.
1999 –2004	PhD research at the Leiden Institute of Chemistry in collaboration with Organon/Akzo-Nobel, with Prof. Dr. J.H. van Boom, Prof. Dr. C. A. A. van Boeckel and Dr. G. A. van der Marel. Research project: the synthesis of analogs of aminoglycoside antibiotics.
1998 – 1999	Internship at the Harvard Medical School, Department of Immunology, with Prof. Dr. H. L. Ploegh. Research project: the synthesis and evaluation of inhibitors for the proteasome and cysteine proteases.
1997 – 1998	Internship at the Leiden Institute of Chemistry, in the group of Prof. Dr. J. H. van Boom (bio-organic synthesis), under supervision of Dr. H. S. Overkleeft. Research project: the synthesis of sugar amino acids as conformational restricted dipeptide isosters. Awarded with the Unilever Research Prize 1998.

Professional organisations

2009 – present	Center for Integrated Protein Science Munich (DFG Excellence cluster), associated member
2007 – present	International Proteolysis Society, member
1994 – present	Royal Dutch Chemical Society (KNCV), member

Courses taken

2010	Teaching skills – Sprachraum Weiterbildungszentrum, Ludwig-Maximilian-University
2006	Scientific Management – Stanford University
2005	Instruction to Teaching and Presentation Skills – Stanford University Center for Teaching and Learning
2001	Bio-organic Synthesis – course by Holland Research School of Molecular Chemistry
1998	Working with Radio-isotopes – Harvard Medical School
1997	Science & Journalism – course by the Royal Dutch Chemical Society (KNCV)

Presentations and seminars

2012	Invited lecture, Klinikum Rechts der Isar, Munich, Germany.
2011	Invited lecture, Drug discovery meeting, Max Planck Institute for Psychiatry.
2009	Invited lecture, Radboud University Nijmegen, The Netherlands.
2008	Invited lecture, Max Planck Institute for Plant Breeding, Cologne, Germany
2008	Oral presentation, Pacific Coast Protease School, California
2007	Seminar, Penn Center for Molecular Discovery, University of Pennsylvania.
2007	Oral presentation, Pacific Coast Protease meeting, California.
2006	Seminar, Medicinal Chemistry Department, Utrecht University, Utrecht, The Netherlands.
2006	Seminar, Department of Basic Life Science, Technische Universität München, Munich, Germany.
2006	Oral presentation, Stanford Mass Spectrometry Users Meeting, Stanford, California.
2006	Oral presentation, Pacific Coast Protease Workshop, Palm Springs, California.
2005	Oral presentation, Stanford Department of Pathology, Monterey, California.
2004	Oral presentation, Pacific Protease Workshop, Half Moon Bay, California.
2003	Seminar Bio-organic Synthesis, research group Prof. H. Redlich, Institute for Organic Chemistry, Universität Münster, Münster, Germany.
2002	Oral presentation, Leiden/Amsterdam Center for Drug Research.

Other activities

2010	Organization of the 3rd West-European meeting on activity-based proteomics
2010	Organization of a retreat of several research groups from the department of basic life sciences of the Technical University Munich
2009 – present	Writing blog entries for the website www.chemnixblog.de, a website where German highschoolstudents can ask questions about the chemistry in their daily life

List of publications

32. Serim, S.; Haedke, U.; **Verhelst, S. H. L.** (2012) Activity-based probes for the study of proteases: recent advances and developments. *ChemMedChem.*, in press.

31. Fonovic, M.; **Verhelst, S. H. L.** (2012) Novel cleavable activity-based probes suitable for proteomics-based discovery. *Methods Mol. Biol.*, in press.

30. Haedke, U.; Götz, M.; Baer, P.; **Verhelst, S. H. L.** (2012) Alkyne derivatives of isocoumarins as clickable activity-based probes for serine proteases. *Bioorg. Med. Chem.*, 20: 633-640.

29. Vinothkumar, K. R.; Strisovsky, K.; Andreeva, A.; Christova, Y.; **Verhelst, S. H. L.**; Freeman, M. (2010) The structural basis for catalysis and substrate specificity of a rhomboid protease. *EMBO J.*, 29: 3797-3809.

28. Ravindran S.; Lodoen M. B.; **Verhelst S. H.**; Bogyo M.; Boothroyd J. C. (2009) 4-bromophenacyl bromide specifically inhibits rhoptry secretion during Toxoplasma invasion. *PloS One*. 4: e8143.

27. Beckham, S. A.; Piedrafita, D.; Phillips, C. I.; Samarawickrema, N.; Law, R. H. P.;Smooker, P. M.; Quinsey, N. S.; Irving, J. A.; Greenwood, S.; **Verhelst, S. H. L.**; Bogyo, M.; Turk, B.; Coetzer, T. H.; Wijeyewickrema, L. C.; Spithill, T. W.; Pike R. N. (2009) A major Cathepsin B protease from the liver fluke *Fasciola hepatica* exhibits novel biochemical properties and plays a vital role in the survival of newly excysted juvenile forms *in vitro*. *Int. J. Biochem. Cell Biol.*, 41: 1601-1612.

26. Kaschani, F.; **Verhelst, S. H. L**.; Van Swieten, P. F.; Wang, Z.; Kaiser, M.; Overkleeft, H. S.; Bogyo, M.; Van der Hoorn, R. A. L. (2009) Minitags for small molecules: detecting targets of reactive small molecules in living plant tissues using click-chemistry. *The Plant Journal*, 57: 373-85.

25. Yang, Z.; Fonovic, M.; **Verhelst, S. H. L.**; Blum, G.; Bogyo, M. (2009) Evaluation of α,β-unsaturated ketone-based probes for papain-family cysteine proteases. *Bioorg. Med. Chem.*, 17: 1071-1078.

24. Burster, T.; Marin-Esteban, V.; Boehm, B. O.; Dunn, S.; Rotzschke, O.; Falk, K.; Weber, E.; **Verhelst, S. H. L.**; Kalbacher, H.; Driessen, C. (2007) Design of protease-resistant myelin basic protein-derived peptides by cleavage site directed amino acid substitutions. *Biochem. Pharm.*, 74: 1514-1523.

23. Fonovic, M.; **Verhelst, S. H. L.**; Sorum, M. T.; Bogyo, M. (2007) Proteomic evaluation of chemically cleavable activity based probes. *Mol. Cell. Proteomics*, 6: 1761-1770.

22. Sadaghiani, A. M.; **Verhelst, S. H. L.**; Gocheva, V.; Hill, K.; Majerova, E.; Stinson, S.; Joyce, J. A.; Bogyo, M. (2007) Design, synthesis and evaluation of *in vivo* potency and selectivity of epoxysuccinyl-based inhibitors of papain family cysteine proteases. *Chem. Biol.*, 14: 499-511.

21. Cuerrier, D.; Moldoveanu, T.; Campbell, R. L.; Kelly, J.; Yoruk, B.; **Verhelst, S. H. L.** ; Greenbaum, D.; Bogyo, M.; Davies, P. L. (2007) Development of calpain-specific inactivators by screening of positional-scanning epoxide libraries. *J. Biol. Chem.*, 282: 9600-9611.

20. **Verhelst, S. H. L.**; Fonovic, M.; Bogyo, M. (2007) A mild chemically cleavable linker system for functional proteomic applications. *Angew. Chem. Int. Ed.,* 46: 1284-1286.

19. Sexton, K. B.; Kato, D.; Berger, A.; Fonovic, M.; **Verhelst, S. H. L.**; Bogyo, M. (2007) Specificity of aza-peptide electrophile activity-based probes of caspases. *Cell Death Differ.*, 14: 727-732.

18. Sadaghiani, A. M.; **Verhelst, S. H. L.**; Bogyo, M. (2007) Tagging and detection strategies for activity-based proteomics. *Curr. Opin. Chem. Biol.*, 11: 20-28.

17. Sadaghiani, A. M.; **Verhelst, S. H. L.**; Bogyo, M. (2006) Solid phase methods for the preparation of epoxysuccinate-based inhibitors of cysteine proteases. *J. Comb. Chem.*, 8: 802-804.

16. Yuan, F.; **Verhelst, S. H. L.**; Blum, G.; Coussens, L. M.; Bogyo, M. (2006) A selective activity-based probe for the papain family cysteine protease dipeptidyl peptidase I/cathepsin C. *J. Am. Chem. Soc.*, 128: 5616-5617.

15. **Verhelst, S. H. L.**; Witte, M. D.; Arastu-Kapur, S.; Fonovic, M.; Bogyo, M. (2006) Novel aza peptide inhibitors and active site probes of papain family cysteine proteases. *ChemBioChem*, 7: 943-950.

14. Kato, D.;* **Verhelst, S. H. L.**;* Sexton, K. B.; Bogyo, M. (2005) A general solid phase method for the preparation of diverse azapeptide probes directed against cysteine proteases. *Org. Lett.*, 7: 5649-5652. * equal authorship.

13. Timmer, M. S. M.; **Verhelst, S. H. L.**; Grotenbreg, G. M.; Overhand, M.; Overkleeft, H. S. (2005) Carbohydrates as versatile platforms in the construction of small compound libraries. *Pure & Applied Chem.*, 77: 1173-1182.

12. **Verhelst, S. H. L**.; Bogyo, M. (2005) Solid phase synthesis of double headed epoxysuccinyl activity based probes for selective targeting of papain family cysteine proteases. *ChemBioChem*, 6: 824-827.

11. **Verhelst, S. H. L.**; Bogyo, M. (2005) Dissecting protein function using chemical proteomic methods. *QSAR Comb. Sci.*, 24: 261-269.

10. **Verhelst, S. H. L.**; Bogyo, M. (2005) Chemical proteomics applied to target identification and drug discovery. *Biotechniques*, 38: 175-177.

9. Chehade, K. A. H.; Baruch, A.; **Verhelst, S. H. L.**, Bogyo, M. (2005) An improved preparation of the activity-based probe JPM-OEt and in situ applications. *Synthesis*, 240-244.

8. **Verhelst, S. H. L.**; Magnée, L.; Wennekes, T.; Wiedenhof, W.; Van der Marel, G. A.; Overkleeft, H. S.; Van Boeckel, C. A. A.; Van Boom, J. H. (2004) Glycosylation of cyclitols: novel analogs of aminoglycoside antibiotics. *Eur. J. Org. Chem.* 11: 2404-2410.

7. **Verhelst, S. H. L.**; Michiels, P. J. A.; Van der Marel, G. A.; Van Boeckel, C. A. A.; Van Boom, J. H. (2004) Surface plasmon resonance evaluation of various aminoglycoside – RNA hairpin interactions reveals low degree of selectivity. *ChemBioChem,* 5: 937-942.

6. **Verhelst, S. H. L.**; Wennekes, T.; Van der Marel, G. A.; Overkleeft, H. S.; Van Boeckel, C. A. A.; Van Boom, J. H. (2004) Synthesis of orthogonally protected 2-deoxystreptamine stereoisomers. *Tetrahedron* 60: 2813-2822.

5. **Verhelst, S. H. L.**; Paez Martinez, B.; Timmer, M. S. M.; Lodder, G.; Van der Marel, G. A.; Overkleeft, H. S.; Van Boom, J. H. (2003) A short chiral route towards polyhydroxylated indolizidines and quinolizidines. *J. Org. Chem.* 68: 9598-9603.

4. **Verhelst, S. H. L.**; Wiedenhof, W.; Ovaa, H.; Van der Marel, G. A.; Overkleeft, H. S.; Van Boeckel, C. A. A.; Van Boom, J. H. (2002) A stereoselective route towards highly functionalized 4,6-diaminocyclohexene derivatives. *Tetrahedron Lett*. 43: 6451-6455.

3. Shi, G. P.; Bryant, R. A. R.; Riese, R.; **Verhelst, S.**; Driessen, C.; Li, Z. Q.; Brömme, D.; Ploegh, H. L.; Chapman, H. A. (2000) Role for cathepsin F in invariant chain processing and major histocompatability complex class II peptide loading by macrophages. *J. Exp. Med.* 191: 1177-1185.

2. Bogyo, M.; **Verhelst, S.**; Bellingard-Dubouchaud, V.; Toba, S.; Greenbaum, D. (2000) Selective targeting of lysosomal cysteine proteases with radiolabeled electrophilic substrate analogs. *Chem. Biol*. 7: 27-38.

1. Overkleeft, H. S.; **Verhelst, S. H. L.**; Pieterman, E.; Meeuwenoord, N. J.; Overhand, M.; Cohen, L. H.; Van der Marel, G. A.; Van Boom, J. H. (1999) Design and synthesis of a protein: farnesyltransferase inhibitor based on sugar amino acids. *Tetrahedron Lett.* 40: 4103-4106.

Patents

Bogyo, M.; **Verhelst, S. H. L.**; Fonovic, M. A mild chemically cleavable linker for use in affinity purification and proteomics applications. Int. Patent PCT/US2007/017233.

Bogyo, M.; Sadaghiani, A. M.; **Verhelst, S. H. L.** Design and Synthesis of epoxysuccinyl inhibitors of cysteine cathepsins for cancer chemotherapy. US Patent, no US 11/762,735; Int. Patent PCT/2007/071145.

Bogyo, M.; **Verhelst, S. H. L**. Solid-Phase Synthesis of Small Molecule Inhibitors of Cathepsin Cysteine Proteases. US patent, no US 11/; Int. patent, PCT/US2006/000869.

Overkleeft, H. S.; **Verhelst, S. H. L.**; Meeuwenoord, N. J.; Pieterman, E. J.; Cohen, L. H.; Overhand, M.; Van der Marel, G. A.; Van Boom, J. H. Novel protein: prenyl transferase inhibitors. European patent, no EP1028117.