CURRICULUM VITAE TOM DESMET

Contact

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Personal

Tom R.J.M. Desmet
Born on April 16th, 1976
Belgian nationality

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Professional Career

Feb 2011 - present	**Associate Professor for Biocatalysis and Enzyme Engineering** Department of Biochemical and Microbial Technology Ghent University, independent position
Jul 2010 - Oct 2010	**Visiting Research Associate** Laboratory of Microbiology, Unit for Fungal Genomics Wageningen University, with Prof. Willem de Vos
Nov 2008 - Jan 2011	**Assistant Professor for Biocatalysis and Enzyme Technology** Department of Biochemical and Microbial Technology Ghent University, with Prof. Wim Soetaert
Apr 2006 - Oct 2008	**Post-doctoral Research Fellow** Centre for Industrial Biotechnology and Biocatalysis Ghent University, with Prof. Erick Vandamme
Oct 2005 - Mar 2006	**Post-doctoral Research Fellow** Laboratory for Protein Biochemistry Ghent University, with Prof. Bart Devreese
Jan 2001 - Sep 2005	**Doctoral Candidate** Laboratory of Enzymology Ghent University, with Prof. Marc Claeyssens

Academic Education

Bachelor of Medicine	Ghent University (1997)	cum fructu
Master of Biochemistry	Ghent University (2000)	cum laude
Doctor of Biochemistry	Ghent University (2005)	congratulations of the jury

Dissertation: "Novel insights in the reaction mechanisms and specificities of *Hypocrea jecorina* cellulases and hemicellulases" (promotor: Prof. Marc Claeyssens)

Research

Characterisation, engineering and application of carbohydrate-active enzymes

- enzyme kinetics and assay development (spectroscopy)
- homology modelling and ligand docking (Yasara)
- enzyme engineering by rational design and directed evolution
- enzyme immobilisation and reaction engineering
- carbohydrate analysis (HPAEC-PAD and colorimetric assays)

Collaborative projects

- SUSY: Sucrose Synthase as Cost-Effective Mediator of Glycosylation Reactions (overall coordinator, EC/FP7, 2013-2017)
- HANNE: High-throughput Annotation of Enzymes (co-promotor, HoGent, 2012-2015)
- NOVOSIDES: Novel Biocatalysts for the Production of Glycosides (scientific coordinator, EC/FP7, 2011-2014)
- MULTIGLYCONANO: Multivalent Glycosystems for Nanoscience (national representative, EC/COST, 2011-2014)
- GLYCODIRECT: A directed evolution platform for the development of a generic glycosylation technology (project manager, IWT/SBO, 2006-2009)

Teaching

Lecturer of the following courses

- Biocatalysis and Enzyme Technology (University of Antwerp, 2010 - present)
- Biocatalysis and Enzyme Technology (University of Ghent, 2007 - present)

Responsible for the following programs

- Major in Industrial Biotechnology for Master students 'Cell and Gene Biotechnology' (UGent)
- Internships for Master students 'Chemistry and Bioprocess Technology' (UGent)

Services

- Member of the Scientific Committee of ESAB: Section on Applied Biocatalysis of the EFB
- Member of FISCH: Flanders Initiative for Sustainable Chemistry
- Associate Editor of Biotechnology Letters
- Regular reviewer for various journals and funding agencies
- Organization of the following conferences:
  - *4th International Conference on Novel Enzymes*. 14-17 October 2014, Ghent, Belgium (organizer)
  - *4th International Conference on Industrial biotechnology*, 8-11 June 2014, Rome, Italy (scientific committee)
  - *2nd Zing Conference on Biocatalysis*. 4-7 December 2012, Xcaret, Mexico (co-organizer, together with John Woodley from TU Denmark)

Publications

Papers

1. Verhaeghe T, Aerts D, Diricks M, Soetaert W and Desmet T (2014) The quest for a thermostable sucrose phosphorylase reveals sucrose 6'-phosphate phosphorylase as a novel specificity. *Applied Microbiology and Biotechnology*, accepted
2. Vandekerckhove S, Desmet T, Tran HG, de Kock C, Smith PJ, Chibale K and D'hooghe M (2014) Synthesis of halogenated 4-quinolones and evaluation of their antiplasmodial activity. *Bioorganic & Medicinal Chemistry Letters*, 24:1214-1217
3. De Winter K, Simčíková D, Schalck B, Weignerová L, Pelantova H, Soetaert W, Desmet T, Křen V (2013) Chemoenzymatic synthesis of α-L-rhamnosides using recombinant α-L-rhamnosidase from *Aspergillus terreus*. *Bioresource Technology*, 147:640-644.
4. Verhaeghe T, Diricks M, Aerts D, Soetaert W and Desmet T (2013) Mapping the acceptor site of sucrose phosphorylase from *Bifidobacterium adolescentis* by alanine scanning. *Journal of Molecular Catalysis B: Enzymatic*, 96:81-88
5. Vandekerckhove S, Tran HG, Desmet T and D'hooghe M (2013) Evaluation of (4-aminobutyloxy)quinolines as a novel class of antifungal agents. *Bioorganic & Medicinal Chemistry Letters*, 23(16):4641-4643
6. Aerts D, Verhaeghe T, Joosten HJ, Vriend G, Soetaert W, Desmet T (2013) Consensus engineering of sucrose phosphorylase: the outcome reflects the sequence input. *Biotechnology and Bioengineering*. 110(10):2563-2572.
7. Beerens K, Soetaert W and Desmet T (2013) Characterization and mutational analysis of the UDP-Glc(NAc) 4-epimerase from *Marinithermus hydrothermalis. Applied Microbiology and Biotechnology*, 97(17):7733-7740
8. De Winter K, Verlinden K, Křen V, Weignerová L, Soetaert W and Desmet T (2013) Ionic liquids as cosolvents for glycosylation by disaccharide phosphorylases: balancing acceptor solubility and enzyme stability. *Green chemistry*, 15(7):1949-1955.
9. De Vreese R, Verhaeghe T, Desmet T and D'hooghe M (2013) Potent and selective HDAC6 inhibitory activity of N-(4-hydroxycarbamoylbenzyl)-1,2,4,9-tetrahydro-3-thia-9-azafluorenes as novel sulfur analogues of Tubastatin A. *Chemical Communications*, 49(36):3775-3777
10. Mollet K, D'hooghe M, Broeckx L, Danneels B, Desmet T and De Kimpe N (2013) Synthesis of piperidin-4-ones starting from 2-(2-bromo-1,1-dimethylethyl)azetidines and 2-(2-mesyloxyethyl)azetidines through a ring expansion-oxidation protocol. *Tetrahedron*, 69(12):2603-2607
11. Vanholme B, Desmet T, Ronsse F, Rabaey K, Van Breusegem F, De Mey M, Soetaert W, Boerjan W (2013) Towards a carbon-negative sustainable bio-based economy. *Frontiers in Plant Biotechnolog*y, 4:174
12. D'hooghe M, Vervisch K, Törnroos KW, Verhaeghe T, Desmet T, Lategan C, Smith PJ, Chibale K, De Kimpe N (2013) Synthesis of 2-aminomethyl-1-azabicyclo[2.2.1]heptanes and evaluation of their antimalarial activity. *Bioorganic & Medicinal Chemistry Letters*, 23(5): 1507-1510

13. Van der Borght J, Soetaert W and Desmet T (2012) Engineering the acceptor specificity of trehalose phosphorylase for the production of trehalose analogues. *Biotechnology Progress*, 28(5):1257-1262
14. De Winter K, Soetaert W and Desmet T (2012) An imprinted cross-linked enzyme aggregate (iCLEA) of sucrose phosphorylase: combining improved stability with altered specificity. *International Journal of Molecular Sciences*, 13:11333-11342
15. Desmet T, Soetaert W, Bojarová P, Kren V, Dijkhuizen L, Eastwick-Field V and Schiller A (2012) Enzymatic glycosylation of small molecules: challenging substrates require tailored catalysts. *Chemistry: A European Journal*, 18: 10786-10801
16. Chen C, Desmet T, Van der Borght J, Lin SKC and Soetaert W (2012) Adsorption-desorption of trehalose analogues from a bioconversion mixture using activated carbon. *Separation and Purification Technology*, 96: 161-167
17. Beerens K, Desmet T and Soetaert W (2012) Enzymes for the biocatalytic production of rare sugars. *Journal of Industrial Microbiology & Biotechnology*, 39: 823-834
18. Tran GH, Desmet T, Saerens K, Waegeman H, Vandekerckhove S, D'hooghe M, Van Bogaert I and Soetaert W (2012) Biocatalytic production of novel glycolipids with cellodextrin phosphorylase. *Bioresource Technology*, 115: 84-87
19. Desmet T and Soetaert W (2012) Broadening the synthetic potential of disaccharide phosphorylases through enzyme engineering. *Process Biochemistry*, 47: 11-17
20. Chen C, Soetaert W and Desmet T (2012) Characterization of β-galactoside phosphorylases with diverging acceptor specificities. *Enzyme and Microbial Technology*, 49(1): 59-65
21. Cerdobbel A, De Winter K, Aerts D, Kuipers R, Joosten HJ, Soetaert W and Desmet T (2011) Increasing the thermostability of sucrose phosphorylase by a combination of sequence- and structure-based mutagenesis. *Protein engineering, Design and Selection*, 24(11): 829-834
22. De Groeve MRM, Desmet T and Soetaert W (2011) Engineering of cellobiose phosphorylase for glycoside synthesis. *Journal of Biotechnology*, 156: 253-260
23. Van der Borght J, Chen C, Hoflack L, Van Renterghem L, Desmet T and Soetaert W (2011) Enzymatic properties and substrate specificity of trehalose phosphorylase from *Caldanaerobacter subterraneus*. *Applied and Environmental Microbiology*, 77(19): 6939-6944
24. De Winter K, Cerdobbel A, Soetaert W and Desmet T (2011) Operational stability of immobilized sucrose phosphorylase: continuous production of α-glucose-1-phosphate at elevated temperatures. *Process Biochemistry*, 49(10): 59-65
25. Aerts D, Verhaeghe T, Roman B, Stevens C, Desmet T and Soetaert W (2011) Transglucosylation potential of six sucrose phosphorylases towards different classes of acceptors. *Carbohydrate Research*, 346: 1860-1867
26. Tran HG, Desmet T, De Groeve M and Soetaert W (2011) Probing the active site of cellodextrin phosphorylase from *Clostridium stercorarium*: kinetic characterization, ligand docking and site-directed mutagenesis. *Biotechnology Progress*, 27(2): 326–332
27. Aerts D, Verhaeghe T, De Mey M, Desmet T and Soetaert W (2011) A constitutive expression system for high-throughput screening. *Engineering in Life Sciences*, 11(1): 10-19
28. Desmet T and Soetaert W (2011) Enzymatic glycosyl transfer: mechanisms and applications. *Biocatalysis and Biotransformation*, 29(1): 1-18

29. Cerdobbel A, De Winter K, Desmet T and Soetaert W (2010) Sucrose phosphorylase as cross-linked enzyme aggregate: Improved thermal stability for industrial applications. *Biotechnology Journal*, 5: 1192-1197
30. Cerdobbel A, Desmet T, De Winter K, Maertens J and Soetaert W (2010) Increasing the thermostability of sucrose phosphorylase by multipoint covalent immobilization. *Journal of Biotechnology*, 150: 125-130
31. Van der Borght J, Desmet T and Soetaert W (2010) Enzymatic production of β-D-glucose-1-phosphate. *Biotechnology Journal*, 5(9): 986-993
32. De Groeve MRM, Laurens R, Van Hoorebeke A, Stout J, Desmet T, Savvides SN and Soetaert W (2010) Construction of cellobiose phosphorylase variants with broadened acceptor specificity towards anomerically substituted glucosides. *Biotechnology and Bioengineering*, 107(3): 413-420
33. Desmet T, Claeyssens M, Piens K and Nerinckx W (2010) Synthesis and evaluation of 2-deoxy-2-amino-β-cellobiosides as cellulase inhibitors. *Journal of Carbohydrate Chemistry*, 29(4): 164-180
34. De Groeve MRM, Tran GH, Van Hoorebeke A, Stout J, Desmet T, Savvides SN and Soetaert W (2010) Development and application of a screening assay for glycoside phosphorylases. *Analytical Biochemistry,* 401(1): 162-167
35. Hoflack L, De Groeve M, Desmet T, Van Gerwen P and Soetaert W (2010) High-throughput calorimetry for evaluating enzymatic reactions generating phosphate. *Combinatorial Chemistry and High Throughput Screening*, 13(4):331-336
36. Van Hoorebeke A, Stout J, Kyndt J, De Groeve M, Dix I, Desmet T, Soetaert W, Van Beeumen J and Savvides SN (2010) Crystallization and X-ray diffraction studies of cellobiose phosphorylase from *Cellulomonas uda*. *Acta Crystallographica F*, 66: 346-351
37. De Groeve MRM, Depreitere V, Desmet T and Soetaert W (2009) Enzymatic production of alpha-D-galactose 1-phosphate by lactose phosphorolysis. *Biotechnology Letters* 31: 1873-1877
38. De Groeve MRM, De Baere M, Hoflack L, Desmet T, Vandamme EJ and Soetaert W (2009) Creating lactose phosphorylase enzymes by directed evolution of cellobiose phosphorylase. *Protein Engineering*, *Design and Selection* 22: 393-399
39. Lobsanov Y, Yoshida T, Desmet T, Nerinckx W, Yip P, Claeyssens M, Herscovics A and Howell L (2008) Arginine switch modulates activity: structure of a fungal α-1,2-mannosidase in complex with a substrate analog. *Acta Crystallographica D,* 64; 227-236
40. Desmet T, Cantaert T, Gualfetti P, Nerinckx W, Gross L, Mitchinson C and Claeyssens M (2007) An investigation of the substrate specificity of the xyloglucanase Cel74A from *Hypocrea jecorina*. *FEBS Journal*, 74(2): 356-363
41. Nerinckx W, Desmet T and Claeyssens M (2006) Itineraries of enzymatically and non-enzymatically catalyzed substitutions at *O*-glycopyranosidic bonds. *Arkivoc*, 13: 90-116
42. Nerinckx W, Desmet T, Piens K and Claeyssens M (2005) An elaboration on the syn-anti protondonor concept: All glycoside hydrolases utilise an analogous strategy for electrostatic stabilisation of the transition state. *FEBS Letters*, 579(2): 302–312
43. Sandgren M, Berglund G, Shaw A, Ståhlberg J, Kenne L, Desmet T and Mitchinson C (2004) Crystal complex structures reveal how substrate is bound in the -4 to the +2 binding sites of *Humicola grisea* Cel12A. *Journal of Molecular Biology*, 342(5): 1505-1517

44. De Vriendt K, Sandra K, Desmet T, Nerinckx W, Van Beeumen J and Devreese B (2004) Evaluation of automated nano-electrospray mass spectrometry in the determination of non-covalent protein-ligand complexes. *Rapid Communications in Mass Spectroscopy*, 18(24): 3061-3067
45. Nerinckx W, Desmet T and Claeyssens M (2003) A hydrophobic platform as a mechanistically relevant transition state stabilising factor appears to be present in the active site of all glycoside hydrolases. *FEBS Letters*, 538(1-3): 1-7
46. Desmet T, Nerinckx W, Stals I, Callewaert N, Contreras R and Claeyssens M (2002) Novel tools for the study of class I alpha-mannosidases: a chromogenic substrate and a substrate-analog inhibitor. *Analytical Biochemistry*, 307(2): 361-367

Book chapters

1. De Winter K, Desmet T, Cerdobbel A and Soetaert W (2012) Preparation and use of sucrose phosphorylase as Cross-Linked Enzyme Aggregate (CLEA). In *Practical Methods for Biocatalysis and Biotransformations 2* (Whittall J & Sutton P, Eds.), 240-244, John Wiley & Sons Ltd, UK.
2. Desmet T, Cerdobbel A, Soetaert W and Vandamme E (2008) Production of bioflavours. In *Advances in Fermentation Technology* (Laroche C & Pandey A, Eds.), 462-482, Asiatech Publishers, New Delhi.

Patents

1. Van der Borght J, Desmet T, Soetaert W and Chen C. Trehalose phosphorylases and their use in the biocatalytic production of trehalose analogues and glycosyl phosphates (WO 2012/080100)
2. Cerdobbel A, Desmet T and Soetaert W. A thermostable sucrose phosphorylase (WO/2011/124538)
3. Tran HG, Desmet T and Soetaert W. Biocatalytic production of cellobiosides (WO 2011/144706)
4. De Groeve M, Desmet T and Soetaert W. Novel lactose phosphorylase enzymes (WO 2009/080774)