

Dr. Koen Van Laer

Redox regulation (A160)

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ACADEMIC EDUCATION

University Degree (2003 - 2008)

Master in Bio-Engineering
Specialization: Medical Biotechnology
*Vrije Universiteit Brussel,
Brussels, Belgium*

Master thesis Bio- and quantum-chemical analysis of the cysteine reactivity in the thioredoxin-arsenate reductase complex.

PI: Joris Messens (Structural Biology Brussels) & Frank De Proft (Chemistry department VUB)

PhD thesis (2010 - 2013)

Redox regulation in Actinomycetes: The mycoredoxin-1 and NrdH-redoxin thiol-switch mechanisms of *Mycobacterium tuberculosis* and *Corynebacterium glutamicum*.

PI: Joris Messens

*Department of Structural Biology Brussels at Vrije universiteit Brussel,
Brussels, Belgium*

Post-doctoral researcher (2014 - present)

Development and characterization of novel peroxiredoxin-based hydrogen peroxide sensors

PI: Tobias P. Dick

*Redox regulation at Deutsches Krebsforschungszentrum (DKFZ)
Heidelberg, Germany*

GRANTS

[1] Doctoral scholarship for strategic basic research from the agency for innovation by science and technology (IWT, Belgium) for PhD thesis

INDUSTRIAL EXPERIENCE

Ablynx (2008 -2010)

Research associate Biochemistry

[Ablynx](#), Technologiepark 21, B-9052
Ghent, Belgium

PUBLICATION LIST

1: Peralta D, Bronowska AK, Morgan B, Dóka É, **Van Laer K**, Nagy P, Gräter F, Dick TP. *A proton relay enhances H₂O₂ sensitivity of GAPDH to facilitate metabolic adaptation.* **Nat Chem Biol.** 2015 Feb;11(2):156-63. doi: 10.1038/nchembio.1720. Epub 2015 Jan 12. PubMed PMID: 25580853.

2: Hugo M, **Van Laer K**, Reyes AM, Vertommen D, Messens J, Radi R, Trujillo M. *Mycothiols/mycoredoxin 1-dependent reduction of the peroxiredoxin AhpE from Mycobacterium tuberculosis.* **J Biol Chem.** 2014 Feb 21;289(8):5228-39. doi: 10.1074/jbc.M113.510248. Epub 2013 Dec 30. PubMed PMID: 24379404; PubMed Central PMCID: PMC3931079.

3: **Van Laer K**, Oliveira M, Wahni K, Messens J. *The concerted action of a positive charge and hydrogen bonds dynamically regulates the pK_a of the nucleophilic cysteine in the NrdH-redoxin family.* **Protein Sci.** 2014 Feb;23(2):238-42. doi: 10.1002/pro.2397. Epub 2013 Dec 13. PubMed PMID: 24243781; PubMed Central PMCID: PMC3926748.

4: Chi BK, Busche T, **Van Laer K**, Bäsell K, Becher D, Clermont L, Seibold GM, Persicke M, Kalinowski J, Messens J, Antelmann H. *Protein S-mycothiolation functions as redox-switch and thiol protection mechanism in Corynebacterium glutamicum under hypochlorite stress.* **Antioxid Redox Signal.** 2014 Feb 1;20(4):589-605. doi: 10.1089/ars.2013.5423. Epub 2013 Sep 18. PubMed PMID: 23886307; PubMed Central PMCID: PMC3901351.

5: **Van Laer K**, Dziewulska AM, Fislage M, Wahni K, Hbeddou A, Collet JF, Versées W, Mateos LM, Tamu Dufe V, Messens J. **NrdH-redoxin of Mycobacterium tuberculosis and Corynebacterium glutamicum dimerizes at high protein concentration and exclusively receives electrons from thioredoxin reductase.** *J Biol Chem.* 2013 Mar 15;288(11):7942-55. doi: 10.1074/jbc.M112.392688. Epub 2013 Jan 28. PubMed PMID: 23362277; PubMed Central PMCID: PMC3597831.

6: **Van Laer K**, Hamilton CJ, Messens J. **Low-molecular-weight thiols in**

thiol-disulfide exchange. *Antioxid Redox Signal.* 2013 May 1;18(13):1642-53. doi: 10.1089/ars.2012.4964. Epub 2012 Dec 18. Review. PubMed PMID: 23075082.

7: **Van Laer K**, Buts L, Foloppe N, Vertommen D, Van Belle K, Wahni K, Roos G, Nilsson L, Mateos LM, Rawat M, van Nuland NA, Messens J. *Mycoredoxin-1 is one of the missing links in the oxidative stress defence mechanism of Mycobacteria.* **Mol Microbiol.** 2012 Nov;86(4):787-804. doi: 10.1111/mmi.12030. Epub 2012 Sep 27. PubMed PMID: 22970802.

8: Roos G, Foloppe N, **Van Laer K**, Wyns L, Nilsson L, Geerlings P, Messens J. *How thioredoxin dissociates its mixed disulfide.* **PLoS Comput Biol.** 2009 Aug;5(8):e1000461. doi: 10.1371/journal.pcbi.1000461. Epub 2009 Aug 13. PubMed PMID: 19675666; PubMed Central PMCID: PMC2714181.