

CV David Leitsch

Date of Birth: 8th of May, 1978, in Vienna, Austria.

Laboratory: Institut für Spezifische Prophylaxe und Tropenmedizin, Zentrum für Pathophysiologie, Infektiologie und Immunologie, Medizinische Universität Wien, A-1090 Vienna, Austria

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MAIN AREA OF RESEARCH: The molecular biology of protist parasites with a special emphasis on the cellular redox system as target of antiparasitic drugs. Major findings include the identification of the thioredoxin-mediated redox system as a target of metronidazole in *Trichomonas vaginalis*, *Entamoeba histolytica* and *Giardia lamblia* and the inhibition of flavin-dependent enzymes, e.g. thioredoxin reductase and flavin reductase 1, as a cause of metronidazole resistance in *T. vaginalis*.

EDUCATION:

- 2003 - 2007:** University of Vienna, PhD study in genetics, Dr. rer. nat (PhD); thesis entitled: "Proteomics in *Entamoeba* spp.: comparative proteome profiling and search for drug targets"
- 1996 - 2002:** University of Vienna, study in genetics, Mag. rer. nat. (MSc); thesis entitled: "Studies on the RNA-chaperone-like protein Hfq in *Escherichia coli*".

EMPLOYMENT:

- 06/2022- Associate Professor at the Institute of Specific Prophylaxis and Tropical Medicine at the Medical University of Vienna
- 03/2016 – 05/2022 Research fellow at the Institute of Specific Prophylaxis and Tropical Medicine at the Medical University of Vienna (funded by the Austrian Science Fund)
- 03/2014 – 02/2016 Schroedinger research fellow at the Institute of Parasitology at the University of Berne, Switzerland (funded by the Austrian Science Fund)
- 07/2010 – 02/2014 Senior Post-Doc/independent researcher at the Institute of Specific Prophylaxis and Tropical Medicine at the Medical University of

Vienna (funded by the Austrian Science Fund)

09/2006 - 06/2010 Postgraduate Research Student/Postdoctoral Research Fellow
in the work group of Univ. Doz. Dr. Julia Walochnik at the Institute of
Specific Prophylaxis and Tropical Medicine at the Medical University
of Vienna (funded by the Austrian Science Fund)

10/2003 – 08/2006: Postgraduate Research Student in the work group of Prof. Dr.
Michael Duchêne, at the Institute of Specific Prophylaxis and
Tropical Medicine at the Medical University of Vienna.
(funded by the Austrian Science Fund)

THE 10 MOST SIGNIFICANT PUBLICATIONS IN TEMPORAL ORDER:

1. Mayr AL, Paunkov A, Hummel K, Razzazi-Fazeli E, Leitsch D. (2024). Comparative proteomic analysis of metronidazole-sensitive and resistant *Trichomonas vaginalis* suggests a novel mode of metronidazole action and resistance. *Int J Parasitol Drugs Drug Resist.* **26**:100566. doi: 10.1016/j.ijpddr.2024.100566.
2. Paunkov A, Gutenbrunner K, Sóki J, Leitsch D. (2022). Haemin deprivation renders *Bacteroides fragilis* hypersusceptible to metronidazole and cancels high-level metronidazole resistance. *J Antimicrob Chemother* doi: 10.1093/jac/dkab485. Online ahead of print.
3. Leitsch D, Mbouaka AL, Köhler M, Müller N, Walochnik J. (2021). An unusual thioredoxin system in the facultative parasite *Acanthamoeba castellanii*. *Cell Mol Life Sci.* **78**:3673-3689. doi: 10.1007/s00018-021-03786-x.
4. Leitsch D., Williams, C.F., Hrdý I. (2018) Redox pathways as drug targets in microaerophilic parasites. *Trends Parasitol.* **34**: 576-589. doi: 10.1016/j.pt.2018.04.007.
5. Leitsch, D. (2017) Drug susceptibility testing in microaerophilic parasites: cysteine strongly affects the effectivities of metronidazole and auranofin, a novel and promising antimicrobial. *Int. J. Parasitol. Drugs Drug Resist.* **7**:321-327. doi: 10.1016/j.ijpddr.2017.09.001.
6. Leitsch D., Müller J., Müller N. (2016) Evaluation of *Giardia lamblia* thioredoxin reductase as drug activating enzyme and as drug target. *Int. J. Parasitol. Drugs Drug. Resist.* **6**:148-153. doi: 10.1016/j.ijpddr.2016.07.003.
7. Leitsch D., Janssen BD, Kolarich D, Johnson PJ, Duchêne M (2014) *Trichomonas vaginalis* flavin reductase 1 (FR1) and its role in metronidazole resistance. *Mol. Microbiol.* **91**: 198-208. doi: 10.1111/mmi.12455.

8. Leitsch D., Burgess A.G., Dunn L.A., Krauer K.G., Tan K, Duchêne M., Upcroft P., Eckmann L., Upcroft J.A. (2011) Pyruvate:ferredoxin oxidoreductase and thioredoxin reductase are involved in 5-nitroimidazole activation while flavin metabolism is linked to 5-nitroimidazole resistance in *Giardia lamblia*. *J. Antimicrob. Chemother.* **66**: 1756-1765.
doi: 10.1093/jac/dkr192.
9. Leitsch D., Kolarich D., Binder M., Stadlmann J., Altmann F., Duchêne M. (2009) *Trichomonas vaginalis*: metronidazole and other nitroimidazole drugs are reduced by the flavin enzyme thioredoxin reductase and disrupt the cellular redox system. Implications for nitroimidazole toxicity and resistance. *Mol. Microbiol.* **72**: 518-536. doi: 10.1111/j.1365-2958.2009.06675.x.
10. Leitsch D., Kolarich D., Wilson I.B.H., Altmann F. and Duchêne M. (2007) Nitroimidazole Action in *Entamoeba histolytica*: A Central Role for Thioredoxin Reductase. *PLOS Biology*, 5: e211.
doi: 10.1371/journal.pbio.0050211.

AWARDS:

2013: Erwin Schrödinger Scholarship of the Austrian Science Fund

2010: Microbiology Prize of the Austrian Society for Hygiene, Microbiology, and Preventive Medicine.

2010: Researcher of the Month of the Medical University of Vienna (Jan. 2010).

2008: Sanofi-Aventis Prize.

REVIEWING ACTIVITIES FOR:

National Institutes of Health (NIH)

Czech Science Fund (GAČR)

MEMBERSHIPS:

F1000 Faculty member, section Microbiology/Parasitology

Austrian Society for Tropical Medicine and Parasitology (ÖGTP)

German Society for Parasitology (DGP)

American Society for Microbiology (ASM)

GRANTS HELD:

02/2025 – 01/2028: Antioxidant proteins and metronidazole in *Giardia lamblia* (€ 427,228)

Project PAT1919524 of the Austrian Science Fund

03/2022 – 02/2025: Factors of metronidazole resistance in *Trichomonas vaginalis* (€ 415,233)

Project P 35545 of the Austrian Science Fund

11/2019 – 10/2022: Nim-mediated metronidazole resistance in *B. fragilis* (€ 322,284)

Project I 4234 of the Austrian Science Fund

03/2014 – 02/2017: Thioredoxin reductase in *G. lamblia*

Erwin Schrödinger Scholarship of the Austrian Science Fund J 3492 (€ 166.570)

07/2010 – 02/2014: Mechanisms of metronidazole resistance in *T. vaginalis* (€ 252,189)

Project P 22546 of the Austrian Science Fund