Nathaniel Yakobov
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Molecular & Cellular Biologist, Microbiologist (Ph.D)

Education

2016 - 2020 Ph.D in Molecular & Cellular Biology "Discovery of RNA dependent ergosterol aminoacylation in higher fungi" – University of Strasbourg (UdS), France

2014 - 2016 MSc in biochemistry, molecular biology and genetic (BMCI-BGM) - UdS, France.

2011 - 2014 BSc in cellular biology and physiology of organisms (BCPO) - UdS, France.

2009 - 2013 Bachelor of languages, literature, and civilizations (LLCE) - specialty German - UdS, France

2009 - 2011 Contest for medical studies entrance (PCEM1) – UdS, France

Research Experiences

2020 - 2021 (3 months)

Postdoctoral fellow

CNRS, UMR7156, Team: Dynamics and plasticity of synthetases. Biological Chemistry and Physiology Institute, Strasbourg, France

PI: Prof. Dr. H. Becker

Technics: co-immunoprecipitation, recombinant protein purification, SUMOpro, in vitro transcription, in vitro enzymatic assays.

2016 – 2020 (49 months)

Project management / Ph.D student

CNRS, UMR7156, Team: Dynamics and plasticity of synthetases. Biological Chemistry and Physiology Institute, Strasbourg, France - *Defended by October 29Th, 2020.*

PI: Prof. Dr. H. Becker; Ph.D supervisors: Dr. B. Senger / Prof. Dr. H. Becker.

Topic: Discovery of tRNA-dependent ergosterol aminoacylation in fungi.

Keywords: Ergosterol, lipid modification factors, aminoacyl-tRNA transferase, aminoacyl-tRNA synthetase, lipid homeostasis.

Technics: model organisms (S. cerevisiae, E. coli), lipid biology, Thin Layer Chromatography (TLC), silica column chromatography, analyzes of mass-spectrometry data, molecular cloning, genetic, fluorescent microscopy, purification of recombinant membranous-proteins, High performance liquid chromatography (HPLC), size exclusion chrom., affinity chrom., ion exchange, Gibson assembly cloning method, site directed mutagenesis, in vitro transcription, RNA transcription, in vitro enzymatic assays, fungal biology, cell-viability assays, phenotyping.

2015 – 2016 (7 months)

Master training

CNRS, UMR7156, Team: Dynamics and plasticity of synthetases. Biological Chemistry and Physiology Institute, Strasbourg, France.

PI: Prof. Dr. H. Becker; Supervisor: Dr. B. Senger.

Topic: **(1)** Development and optimization of molecular and cellular technics in lipid biology.

(2) Establishment of strategies to purify recombinant proteins encoded by *A. fumigatus*.

(3) Determination of the sub-cellular localization of fungal DUF2156 by fluorescent microscopy.

Technics: molecular cloning (classical restriction/ligation, Gateway technologies), fluorescence microscopy, heterologous expression (yeast, bacteria), Thin Layer Chromatography (TLC), yeast biology, recombinant protein purification, analytical protein procedures.

2014 – 2015 **Master training**

(2 months) **CNRS, UMR7156, Team: Dynamics and plasticity of synthetases. Biological Chemistry and Physiology Institute, Strasbourg, France.**

PI: Prof. Dr. H. Becker; Supervisor: Dr. B. Senger.

Topic: Establishment of an *in vivo* model organism (*S. cerevisiae*) to study fungal lipid-modification factors.

Technics: molecular cloning (classical restriction/ligation, Gateway technologies), fluorescent microscopy, heterologous expression, yeast biology

Publications

- **Yakobov, N**., Mahmoudi, Fischer, F., Roy, H., Senger, B., Tatematsu, S., Yokokawa, D., Nakajima, H., Kushiro, T., & Becker, HD. (2021) RNA-dependent synthesis of ergosteryl-3β-O-glycine expands the diversity of steryl-amino acid conjugates in ascomycota. *(In preparation).*
- **Yakobov, N**., Fischer, F., Mahmoudi, N., Saga, Y., Grube C., Roy, H., Senger, B., Grob, G., Tatematsu, S., Yokokawa, D., Mouyna, I., Latgé, JP., Nakajima, H., Kushiro, T., & Becker, HD. (2020) RNA-dependent sterol aspartylation in fungi, *PNAS*, 117(26):14948-14957.
- Hemmerle, M., Wendenbaum, M., Grob, G., **Yakobov, N**., Mahmoudi, N., Senger, B., Debard, S., Fischer, F., and Becker, HD. (2020). Non-canonical inputs and outputs of tRNA aminoacylation. Book chapter In *The Enzymes*, 48(5):117-147.
- **Yakobov, N**., Debard, S., Fischer, F., Senger, B. & Becker, HD. (2018). Cytosolic aminoacyl-tRNA synthetases: Unanticipated relocations for unexpected functions, *Biochim Biophys Acta*, 1861(4):387-400.

Communications

Oral presentations

- Journées France-Israël, Strasbourg, France. (2018). "Discovery of tRNA-dependent lipid aspartylation in fungi".
- 27th IUMB focused meeting on tRNA biology, Strasbourg, France. (2018). "Characterization of MprF-like lipid aminoacylation factors in fungi".
- UMR7156 Department's day, Strasbourg, France (2018). "Characterization of fungal lipid aminoacylation factors containing a DUF2156 domain".

Poster presentations (presented by)

- Seminar of Microbiology (SMS), Strasbourg, France (2018). **Yakobov, N**., Fischer, F., Senger, B., Roy, R., Kushiro, T., Mouyna, I., Fontaine, T., Latgé, JP. & Becker, HD.
- 27th IUMB focused meeting on tRNA biology, Strasbourg, France. (2018). Characterization of aminoacyl-tRNA transferases related to bacterial MprF in *Aspergillus fumigatus*. Mahmoudi, N., **Yakobov, N.**, Roy, H., Saga, Y., Kushiro, T., Fischer, F. & Becker, HD.
- Doctoral school days, Strasbourg, France (2018): "Functional characterization of fungal DUF2156 proteins". **Yakobov, N**., Fischer, F., Senger, B., Roy, R., Kushiro, T., Mouyna, I., Fontaine, T., Latgé, JP. & Becker, HD.
- 11th IUBMB Focused Meeting on the Aminoacyl-tRNA Synthetases, Clearwater, USA (2017): "Characterization of DUF2156 proteins in fungal species". **Yakobov, N**., Fischer, F., Senger, B., Roy, R., Kushiro, T., Mouyna, I., Fontaine, T., Latgé, JP. & Becker, HD.

- Doctoral school days, Strasbourg, France (2017): "tRNA-dependent membrane remodeling and resistance to antifungal drugs". **Yakobov, N.**, Fischer, F., Senger & Becker, HD.

Collaborations

- Hervé Roy, Ph.D, associate prof., University of Central Florida, Orlando USA: Identification of novel aminoacylated lipids by mass-spectrometry.
- Prof. Tetsuo Kushiro, Meiji University, Tokyo, Japan: Functional characterization of lipid aminoacylation factors in *A. oryzae*. Obtention of chemically synthesized aminoacylated-sterols.
- Prof. Osamu Nureki, University of Tokyo, Tokyo, Japan: Resolving the structure of ergosteryl-aspartate Synthase (ErdS) encoded by *A. fumigatus*.
- Hubert Schaller, PhD, University of Strasbourg, Strasbourg, France: Establishing the profile of aminoacylated sterols in fungal species.
- Christopher MUELLER, Ph.D, IBMC, CNRS – IC2T, Strasbourg, France: Monitoring the immune response to fungal aminoacylated-sterols.

Awards & fellowships

2021	Thesis prize awarded by the Société de Biologie de Strasbourg (SBS)
2018	Award for the best poster presentation at the Doctoral school days 2018, Strasbourg, France.
2017	Award for poster presentation at the 11th IUBMB Focused Meeting on the Aminoacyl-tRNA Synthetases, Clearwater, USA.
2016	Doctoral Fellowship, awarded by the French ministry of research & higher education.

Teaching fellows (University of Strasbourg)

2019 – 2020	**Assistant professor**: Practical formation in experimental Biochemistry & Enzymology, Bachelor 3rd year. (92 hours)
2016 – 2019	**Assistant professor**: Practical formation in Biochemistry and Molecular Biology, Bachelor 2nd year. (192 hours)

Undergraduate student management

Pualani Ateni – Evidencing the complex formed between a Glycyl-tRNA Synthetase and fungal DUF2156 proteins.

Nevena Slovic – Improving overexpression conditions and purification strategies of recombinant proteins.

Languages

French, German, English (Proficient)

Referees to contact.

Prof. Dr. Hubert BECKER	h.becker@unistra.fr	PI of my host lab/Ph.D Supervisor
Dr. Bruno SENGER	b.senger@unistra.fr	Ph.D Supervisor
Dr. Magali FRUGIER	m.frugier@ibmc-cnrs.unistra.fr	Thesis jury president (University of Strasbourg)
Prof. Tetsuo KUSHIRO	kushiro@meiji.ac.jp	Collaborator (Meiji University, Japan)
Dr. Hervé Roy	Herve.Roy@ucf.edu	Collaborator (University of Central Florida, USA)