Eva Přáda (Brichtová)

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EDUCATION

2019 – 2023: **University of Cambridge, UK**
PhD in Biological Chemistry, Yusuf Hamied Department of Chemistry

2018 – 2019: **University of Cambridge, UK**
MPhil in Chemistry, Department of Chemistry

2015 – 2018: **University of Chemistry and Technology, Prague, Czech Republic**
Bc in Chemistry, Faculty of Chemical Engineering
Final state examination result: A – excellent, graduated "with honours"

RESEARCH EXPERIENCE

2023 – present: **TU Wien, Vienna, Austria**
Project Assistant/Post-Doctoral Researcher

Inclusion Body Processing, Analytics, Spectroscopy, Data analysis

2019 – 2023: **Yusuf Hamied Department of Chemistry, University of Cambridge, UK**
PhD student

Using a range of biophysical, chromatographic, and imaging techniques, I studied the physical stability and the effect of manufacturing and formulation processes on aggregation of both lipidated and non-lipidated therapeutic peptides (glucagon-like peptide 1 analogues) used for type 2 diabetes treatment. I investigated (lipo)peptide self-assembly, aggregation mechanisms & kinetics and morphology of resulting aggregates. In the aggregation mechanism of therapeutic peptides, I identified degradation and off-pathway aggregation products. I applied the Energy Landscape Theory, a computational approach, to investigate the conformational behaviour of aggregation-prone peptides.

Project is done in collaboration with AstraZeneca, Cambridge.
Outcomes presented at 3 conferences, 3 first-author manuscripts submitted/in preparation.

2018 – 2019: **Department of Chemistry, University of Cambridge, UK**
MPhil student

I investigated pathways and intermediates in aggregation of therapeutic glucagon-like peptide 1. I employed a range of biophysical techniques and fluorescence kinetic assays to identify peptide oligomers which are off-pathway to the main amyloid formation process.

2014 – 2018: **Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences, Prague, Czech Republic**
Research Assistant, Biomolecular Spectroscopy group

I performed synthesis and subsequent purification and characterization of non-natural amino acids (3-nitrotyrosine) and short peptides. I used multiple spectroscopic techniques including chiroptical spectroscopy and lanthanide luminescent probes to monitor non-covalent peptide interactions. I carried out DFT spectra calculations to support the experimental observations.

10/01/2023

Results presented at 6 international conferences and published in 3 peer-reviewed publications including 1 first-author publication.

2015: **Summer School of Protein Engineering, Loschmidt Laboratories, Masaryk University, Brno, Czech Republic**

Lectures and practicals in Bioinformatics, Microfluidics, Genetic engineering, Protein stability

2012 – 2014: **Institute of Physiology of the CAS, Prague, Czech Republic**
Student Internship

Animal models of schizophrenia, administering dizocilpine, behavioural experiments with rats
Results published in a first-author (shared authorship) peer-reviewed publication.

RESEARCH SKILLS

Laboratory techniques:

Spectroscopy: UV-Vis and circular dichroism, FT-IR and vibrational circular dichroism, Raman spectroscopy and Raman optical activity, fluorescence spectroscopy — mainly applied for peptide and peptide aggregate characterization; NMR — small molecule identification
Fluorescence assays: dye binding assays, high throughput plate reader assays for peptide aggregation studies
Other analytical techniques: analytical ultracentrifugation, size exclusion chromatography, thin layer chromatography, native and denaturing protein electrophoresis, isoelectric focusing electrophoresis, LC-MS (applied for peptide and protein characterization)
Transmission electron microscopy — imaging of peptide and lipopeptide aggregates, micelles, vesicles, negative staining, cryo-EM sample preparation
Scanning electron microscopy — imaging of peptide aggregates
Purification techniques: FPLC (ÄKTA system, multiple chromatographic techniques, e.g., size exclusion chromatography, ion-exchange; including method troubleshooting and training other lab members), HPLC (purification of peptides and amino acids), membrane filtration, centrifugation, sonication (amyloid fibril fragmentation, cell lysis), dialysis, lyophilization, crystallization
Organic synthesis of peptide derivatives, solid phase peptide synthesis
Behavioural experiments with rats including subcutaneous drug administration

Other:

Python coding, basic Shell scripting, Linux-based systems, running jobs on clusters
DFT calculations in Gaussian — structure optimization, vibrational and electronic spectra calculations
Energy Landscape Theory calculations in GMIN, OPTIM and PATHSAMPLE
Spectra processing (Origin, SigmaPlot, MestReNova), TIA TEM imaging and analysis
KinTek — Chemical reaction kinetics modelling software

PUBLICATIONS

- **Přáda Brichtová, E.**; Becher, F.; Li, X.; Edu, I; Lindo, V.; Gomes dos Santos, A.; Jackson, S., Self-assembly and aggregation of lipidated analogs of the therapeutic glucagon-like peptide 1. *In preparation.* **2023**
- **Přáda Brichtová, E.,** Keith, A. D., Röder, K., Wales, D., Jackson, S., Relative stabilities of glucagon-like peptide 1 monomers under a selection of pH conditions. *In preparation*. **2023**

- **Přáda Brichtová, E.**; Krupová, M.; Bouř, P.; Lindo, V.; Gomes dos Santos, A.; Jackson, S., Glucagon-like peptide 1 aggregates into stable low molecular weight oligomers "off-pathway to fibrillation". *Under revisions.* **2022**
- Dinku, W.; Isaksson, J.; Rylandsholm, F. G.; Bouř, P., **Brichtová, E.**; Choi, S. U.; ... & Dekebo, A., Anti-proliferative activity of a novel tricyclic triterpenoid acid from Commiphora africana resin against four human cancer cell lines. *Applied Biological Chemistry*. **2020,** 63(1), 1-11.
- **Brichtová, E.**; Hudecová, J.; Vršková, N.; Šebestík, J.; Bouř, P.; Wu, T., Binding of Lanthanide Complexes to Histidine-Containing Peptides Inspected by Raman Optical Activity Spectroscopy. *Chemistry–A European Journal*. **2018**, *24*, 8664-8669.
- Niederhafner, P.; Šafarík, M.; **Brichtová, E.**; Šebestík, J., Rapid acidolysis of benzyl group as a suitable approach for syntheses of peptides naturally produced by oxidative stress and containing 3-nitrotyrosine. *Amino Acids.* **2016**, *48* (4), 1087-1098.
- Lobellová, V**.*; Brichtová, E.***; Petrásek, T.; Valeš, K.; Stuchlík, A., Higher doses of (+)MK 801 (dizocilpine) induced mortality and procedural but not cognitive deficits in delayed testing in the active place avoidance with reversal on the carousel. *Physiological Research*. **2015**, 64 (2), 269-275. (*Authors contributed equally.)

SCHOLARSHIPS AND AWARDS

2022: Accepted to competitive Novo Nordisk "Biophysics and Formulation – Scientist of Tomorrow 2022 symposium"

2019 – 2022: Peterhouse PhD Studentship, full PhD studentship (covering fees + maintenance) for 3 years (+ additional 3 months due to Covid), Peterhouse, University of Cambridge Studentship awarded based on an outstanding academic record and a research proposal.

2018: Bakala Foundation MPhil Scholarship (£12,000)

2018: Krsek Foundation MPhil Scholarship (£3,807)

2018: Recognition of achievements, UCT Prague, Graduated "with honours"

2017: Study results-based award, UCT Prague, excellent mark average in the 1st and 2nd year

2015: Extraordinary scholarship, UCT Prague, successful participation in the Chemistry Olympiad

TEACHING

2021 – 2022: Project supervisor of a master's student, University of Cambridge, UK
Project: Stability studies of lipidated glucagon-like peptide 1 analogues

2020: Synthetic chemistry laboratory demonstrator, practicals for 2nd year undergraduates, University of Cambridge, UK

2019: Chemistry supervisor, 1st year undergraduates, University of Cambridge, UK
Courses: Shapes and structures of molecules, Reactions and mechanisms in organic chemistry, Energetics and equilibria, Kinetics of chemical reactions, Chemistry of the elements

2019 – 2020: Chemistry laboratory demonstrator, 1st year undergraduates, organic and inorganic practicals, University of Cambridge, UK

LANGUAGES

English: fluent/full proficiency; **Czech** : native proficiency; **German:** limited working proficiency; **Spanish**: elementary