




Tim Moritz Weber, M. Sc.

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Research interests: antimicrobial resistance, bacteriocins, *Pseudomonas aeruginosa*, total synthesis, natural products, click chemistry, pyrrole alkaloids, conjugate chemistry

Education

PhD in Organic Chemistry

Since 10/2019

Heinrich Heine University Düsseldorf

Title: "Total synthesis of clickable natural product derivatives and manufacturing of protein conjugates – Application of click chemistry for target specific delivery of potential drugs" at the Institute of Bioorganic Chemistry (Jülich Research Centre) supervisor: Prof. Jörg Pietruszka

M. Sc. in Biochemistry

10/2016–2/2019

Heinrich Heine University Düsseldorf

grade: 1.0

Thesis: "Towards kinetic resolution with the condensing enzyme PigC – A promising method for synthesis of complex chiral prodiginines" (grade: 1.0) at the Institute of Bioorganic Chemistry (Jülich Research Centre) supervisor: Prof. Jörg Pietruszka

Research Internship

1/2018–6/2018

University of Oxford (UK)

Title: "Protein-protein interactions between the *Pseudomonas aeruginosa* toxin Pyocin S5 and the transenvelope protein TonB1" at the Institute of Biochemistry – Protein-protein interactions in the Gram-negative bacterial cell envelope supervisors: Prof. Colin Kleanthous, Dr. Hannah Behrens

B. Sc. in Biochemistry

10/2013–10/2016

Heinrich Heine University Düsseldorf

grade: 1.4

Thesis: "Production of the triterpene squalene and derivatives in *Rhodobacter capsulatus*" (grade: 1.0) at the Institute of Molecular Enzyme Technology (Jülich Research Centre) supervisor: Prof. Karl-Erich Jäger

High School (Abitur)

Städtisches Gymnasium Wülfrath

Research Experience

PhD Studies

- Total synthesis of A-, B-, and C-ring maleimide functionalised prodiginines for labelling of proteins
- Total synthesis of a biotinylated Pittsburgh B analogue for the binding of protein fibrils found in Alzheimer's disease
- Synthesis and characterisation of the novel CuAAC ligand TDETA
- Copper-catalysed azide-alkyne cycloadditions ('click chemistry')
- Cloning, expression, purification, and labelling of pyocin S2 derivatives of *P. aeruginosa*
- Evaluation of pyocin S2-resistance of MDR carbapenem-resistant clinical isolates of *P. aeruginosa* and reduced binding of PyoS2 to its innate immunity protein ImS2 by blocking the interaction surface
- Total synthesis of A-ring alkylated prodiginines and testing of the substrate scope of prodiginine ligases PigC, TreaP, and TamQ (biocatalysis)

Master Thesis

- Synthesis of chiral pyrroles and prodiginines
- Investigation of the prodiginine ligase PigC for enzymatic kinetic resolution

Research Internship

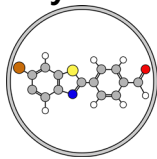
- Cloning, expression and purification of soluble pyocin S5 derivatives, TonB1 and the membrane protein FptA of *P. aeruginosa*
- Interaction studies between pyocin S5 and the transenvelope protein TonB1
- Mapping of the pyocin S5 TonB box
- Fluorescence microscopy with *P. aeruginosa* and labelled pyocin S5

Bachelor Thesis

- Cloning and expression of limiting genes for terpenoid production and establishment of artificial pathways for squalene production
- Genomic integration of the mevalonate pathway into the *R. capsulatus* chromosome
- Metabolic engineering to achieve increased squalene yields
- Enzyme engineering of *Arabidopsis thaliana* squalene-hopene-cyclases for heterologous expression in *R. capsulatus*

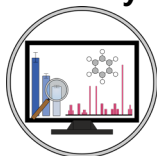
Methods and Skills

Chemistry



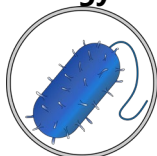
Design of synthesis strategies for total syntheses, retrosynthesis, work under inert atmosphere, Schlenk technique, total and natural product synthesis, extractive workup, column chromatography, dry column vacuum chromatography (DCVC), distillation, click chemistry, titration of organometallic reagents, biocatalysis, biotransformation, mutasynthesis

Chemical Analytics



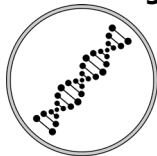
NMR spectroscopy and data assignment, infrared spectroscopy, melting point, LC-MS, GC-MS, determination of extinction coefficients

Microbiology



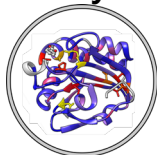
Handling of biological safety level 1 and 2 organisms (*Escherichia coli*, *Pseudomonas aeruginosa*, *Pseudomonas putida*, *Rhodobacter capsulatus*), cloning, conjugation, plate killing assay, fluorescence microscopy

Molecular Biology



Polymerase chain reaction (PCR) [classic, QuickChange, round-the-horn], restriction-ligation cloning, agarose gel electrophoresis, DNA isolation (genomic and plasmid DNA), multiplex PCR, DNase activity assay and densitometry

Biochemistry



Heterologous protein expression, chromatographic protein purification (ÅKTA assisted, Ni-NTA, size exclusion, ion exchange), *in vitro* protein labelling, SDS-PAGE, protein quantification (UV, Bradford, Pierce 660 nm), analytic ultrafiltration, dialysis

Soft Skills



Project management, supervision and teaching, scientific writing, grant writing, § 15 GenTSV expertise of the genetic engineering project manager (certificate)

Teaching Experience

Apprenticeship Instructor

11/2021–5/2023

Applied Enzyme Technology II

2019–2023

Natural Product Synthesis

Supervision of Alexandra Leyens

Total synthesis of A-ring alkylated prodiginines and biotinylated Pittsburgh B analogues

Practical course supervision, 'asymmetric synthesis'

Biochemistry master's degree programme

5x 3 weeks

Practical course supervision

Biochemistry/chemistry master's degree programme

1/2020

3 weeks

Bachelor's Thesis

5/2019–11/2019

Supervision of Sebastian Sill

Title: "Investigation of the substrate scope for the prodigiosin cyclase PRUB680 from *Pseudoalteromonas rubra*"

Research Internship

2/2019–4/2019

Supervision

Total synthesis of pyrroles and pyrrole alkaloids

8 weeks

Scholarships and Awards

Poster Prize

2023

French Society for Microbiology (SMF)

for the poster contribution at the ARAE symposium in Tours (France)

Doctoral Scholarship

10/2019–9/2022

Jürgen Manchot Foundation

Deutschlandstipendium

10/2015–9/2018

Federal Ministry of Education and Research Germany

Erasmus+ scholarship

1/2018–6/2018

European Union

for the internship at the University of Oxford

Publications

Weber, T. M., Leyens, A., Berning, L., Stork, B., & Pietruszka, J. (2023). New Prodigiosin Derivatives – Chemoenzymatic Synthesis and Physiological Evaluation. *Catalysis Science & Technology*.

Kossmann, D. F., Huang, M., Weihmann, R., Xiao, X., Gätgens, F., Weber, T. M., ... & Loeschcke, A. (2023). Production of tailored hydroxylated prodiginine showing combinatorial activity with rhamnolipids against plant-parasitic nematodes. *Frontiers in Microbiology*, *14*, 1151882.

Weber, T. M. & Pietruszka, J. (2023). Synthesis of a Water-Soluble Tridentate (Dimethylamino)ethyl Cu(I)/Cu(II)-Ligand. *Synthesis*, *55*(14): 2128–2133.

Behrens, H. M., Lowe, E. D., Gault, J., Housden, N. G., Kaminska, R., Weber, T. M., ... & Kleanthous, C. (2020). Pyocin S5 import into *Pseudomonas aeruginosa* reveals a generic mode of bacteriocin transport. *MBio*, *11*(2), 10-1128.

Habash, S. S., Brass, H. U., Klein, A. S., Klebl, D. P., Weber, T. M., Classen, T., ... & Schleker, A. S. S. (2020). Novel prodiginine derivatives demonstrate bioactivities on plants, nematodes, and fungi. *Frontiers in Plant Science*, *11*, 579807.

Troost, K., Loeschcke, A., Hilgers, F., Özgür, A. Y., Weber, T. M., Santiago-Schübel, B., ... & Drepper, T. (2019). Engineered *Rhodobacter capsulatus* as a phototrophic platform organism for the synthesis of plant sesquiterpenoids. *Frontiers in Microbiology*, *10*, 1998.

Posters

Weber, T. M. & Pietruszka, J., Total Synthesis of Azide-Functionalised Prodiginines for Conjugation via Copper-Catalysed Azide-Alkyne Cycloaddition, presented at the 22nd European Symposium on Organic Chemistry (ESOC 2023) in Ghent (Belgium).

Weber, T. M., MacKenzie, C. & Pietruszka, J., Pyocin S2 Conjugates for the Treatment of PyoS2-Resistant MDR Clinical Isolates of *Pseudomonas aeruginosa*, presented at the 9th Symposium on Antimicrobial Resistance in Animals and the Environment (ARAE 2023) in Tours (France).

Troost, K., Loeschcke, A., Weber T. M., Jaeger, K.-E., Drepper, T. (2017). *Rhodobacter capsulatus* as alternative microbial platform for terpenoid production. VAAM Annual Conference, Jena, Germany.

Languages

German	Native language
English	Fluent
French	Basic knowledge

Hobbies

Wheelchair Basketball Referee Since 2017	Referee for the German Wheelchair Sports Association (DRS) 1 st Bundesliga (1RBBL) Referee (since 2022) 2 nd Bundesliga (2RBBL) Referee (2018–2022)
Basketball Referee Since 2010	Referee for the West German Basketball Association (WBV)