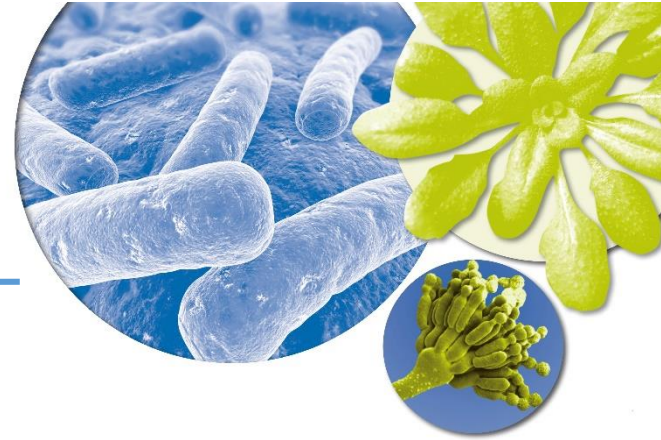


**Master Molecular Life Sciences –
Microbiology, Biotechnology and Biochemistry**



MSc/PhD Program

**Molecular Life Sciences -
Microbiology, Biotechnology and Biochemistry**

Prof. Dr. Stefanie Pöggeler

spoegge@gwdg.de



UNIVERSITÄT
GÖTTINGEN

11_12_2024

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Key feature:

Research-oriented Studies

Primary Model Organisms:

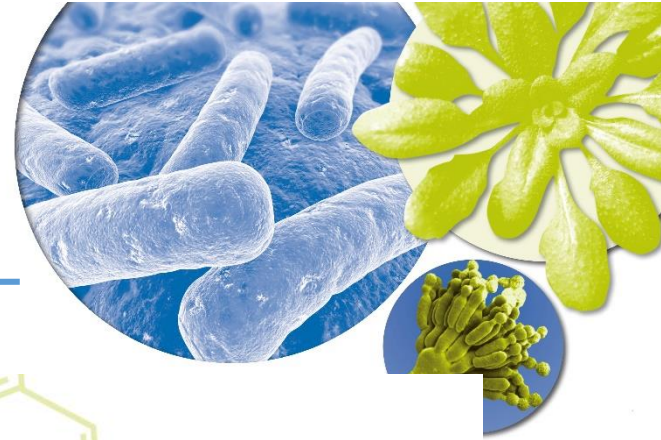
Microorganisms (single cell, multicellular)



Plant-Microbe Interactions

Plants

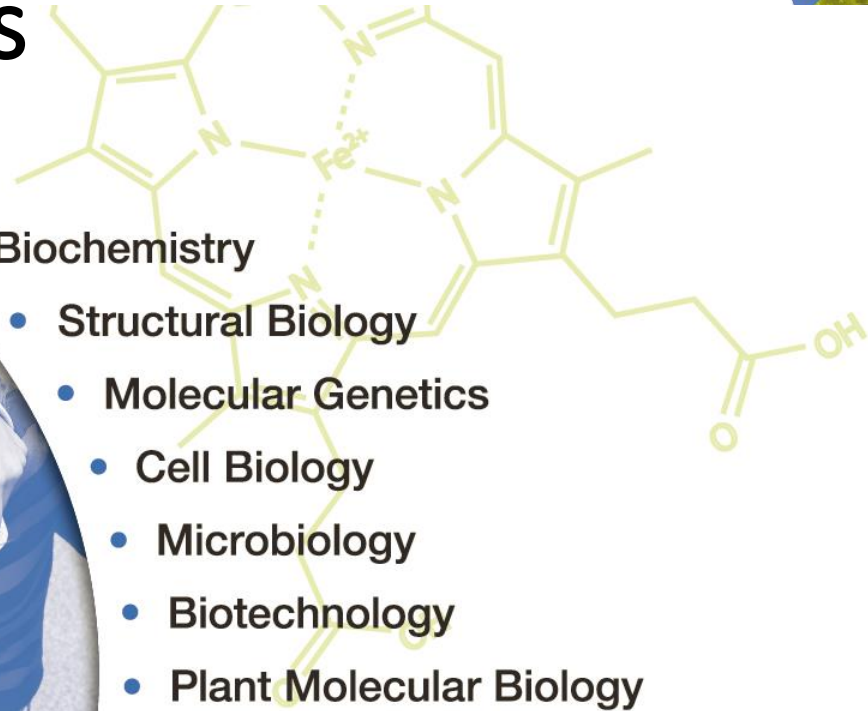
Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



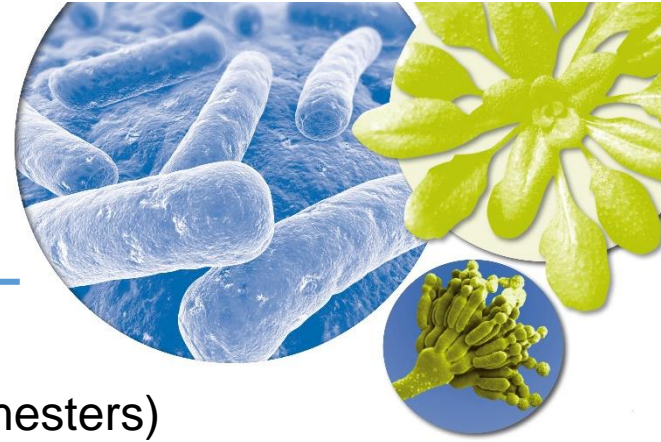
Subjects



- Biochemistry
- Structural Biology
- Molecular Genetics
- Cell Biology
- Microbiology
- Biotechnology
- Plant Molecular Biology
- Plant-Microbe Interactions
- Chemical Biology
- -Omics
- Biophysics
- Bioinformatics



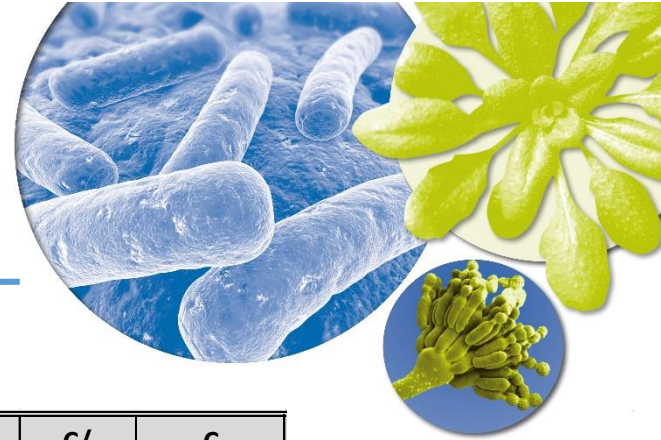
Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Key features

- from BSc to MSc in 2 years (4 semesters)
 - consistent focused program
- 120 credits according to the European Credit Transfer System (ECTS)
 - program limited to 48 students
 - English as main teaching language
- practical training in small groups with state of the art equipment
 - inspiring international research environment
 - complementary training (“soft skills”)
- direct access to the PhD programs of the faculty for excellent students

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Basic structure

module	number	structure and options		C/ module	C total
core module	3	lecture + seminar/tutorial + methods course	choice of 7 different modules	12	36

Seven Core Modules

"General and Applied Microbiology"

"Molecular Genetics & Microbial Cell Biology"

„Applied Bioinformatics in Molecular Bioscience“

"Enzyme Catalysis and Chemical Biology"

WS

"Cell & Molecular Biology of Plant-Microbe Interactions"

"Structural Biochemistry"

"Biochemistry & Biophysics"

„M.Bio.101 General & Applied Microbiology“



Prof. Jörg Stülke

**Metabolic and
Regulatory
Patterns in Bacterial
Cells**

**Regulated protein-RNA
Interaction**



PD Dr. Michael Hoppert

Biomineral formation

**Terrestrial microalgal
biofilms**



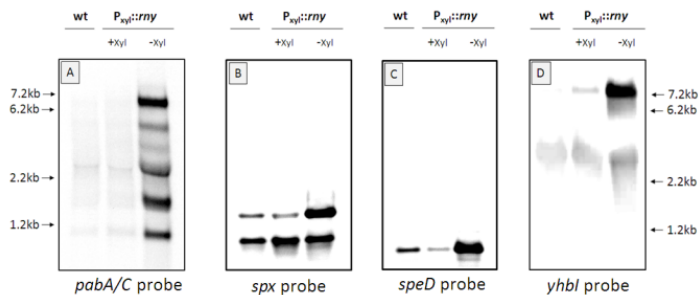
Prof. Rolf Daniel

PD Dr. Heiko Liesegang

(Meta)genomics

**Applied Microbiology
Synthetic Microbiology**

**Genes and enzymes
for biotechnology**



„M.Bio.102 Molecular Genetics & Microbial Cell Biology“



Prof. Stefanie Pöggeler

**Fruiting-body
Development in
Filamentous Ascomycetes**



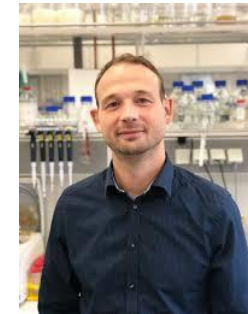
Dr. Daniela Nordzike

**Plant infection by
*Colletotrichum graminicola***



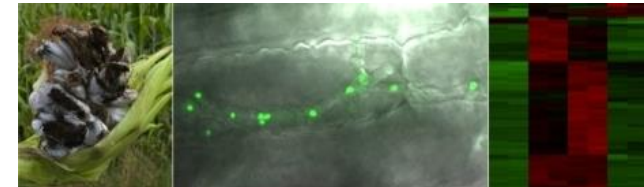
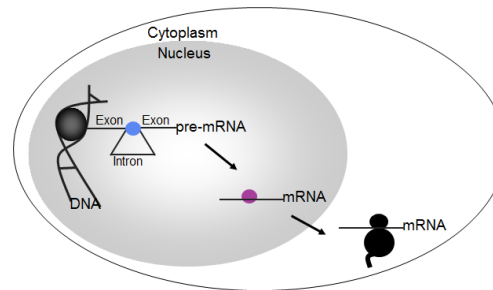
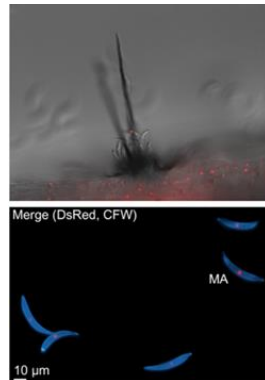
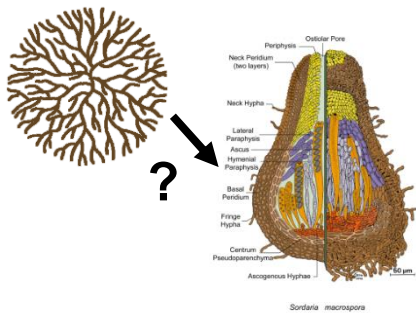
Prof. Heike Krebber

**Nucleocytoplasmic
Transport**



Prof. Kai Heimel

**Unfolded Protein Response
in Filamentous Fungi**



„M.Bio.105 Applied Bioinformatics in Molecular Bioscience“



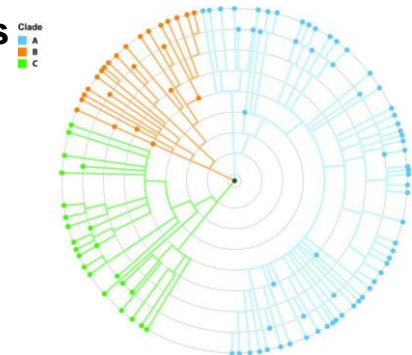
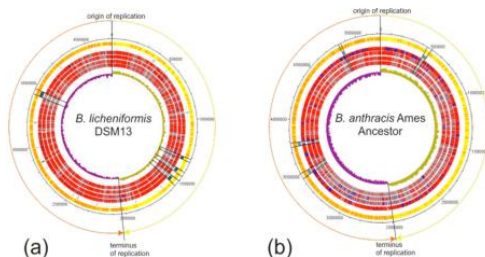
Prof. Rolf Daniel



PD Dr. Heiko Liesegang

Handling of programs, bioinformatic tools and databases with respect to data-driven Omics-based research

- Application of bioinformatic approaches in molecular phylogeny, evolution, genome dynamics und (meta)Omics
- Bioinformatic analysis of RNAs and proteins
- Identification of motifs and genes
- Generation and analysis of metabolic models and networks



„M.Bio 108 Enzyme Catalysis & Chemical Biology“



Jun.-Prof. Nadja Simeth
PhotoBioOrgChemistry

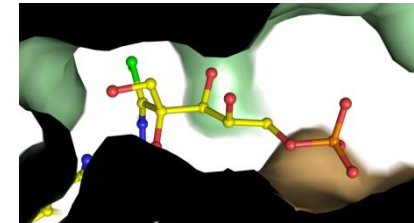
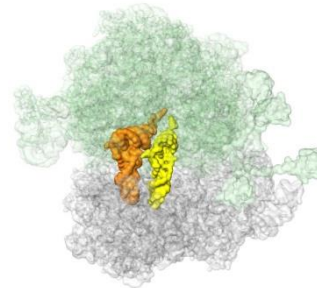
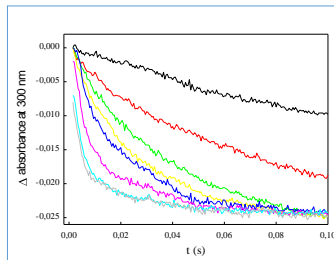
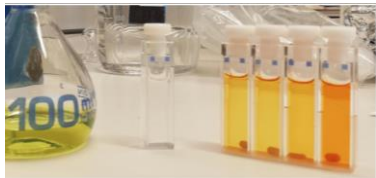


Prof. Kai Tittmann
**Reaction mechanisms of
thiamin-dependent enzymes
and flavoenzymes**



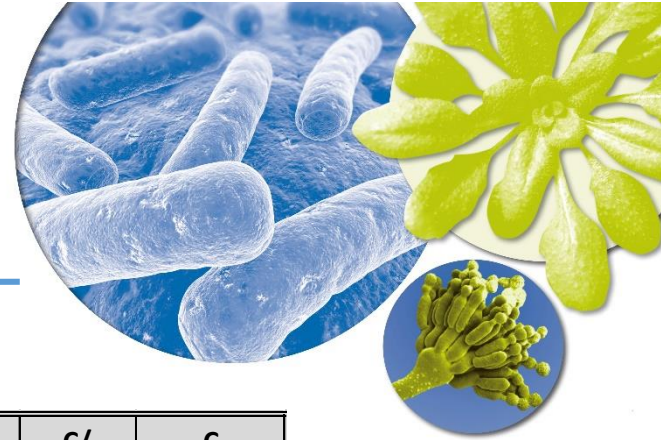
MAX-PLANCK-GESELLSCHAFT
MPI for Multidisciplinary Science

Prof. Marina Rodnina
**Kinetics of
Bacterial Translation**



- Reaction mechanisms of enzymes and macromolecular machines
 - Kinetics and thermodynamics of biochemical reactions
- Synthesis of biooligomers and ligands, attachment of labels to peptides and proteins
 - Chemical model systems of enzymes

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Basic structure

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Seven Core Modules

"General and Applied Microbiology"

"Molecular Genetics & Microbial Cell Biology"

„Applied Bioinformatics in Molecular Bioscience“

"Enzyme Catalysis and Chemical Biology"

"Cell & Molecular Biology of Plant-Microbe Interactions"

"Structural Biochemistry"

"Biochemistry & Biophysics"

SS

„M.Bio.104 Cell & Molecular Biology of Plant-Microbe Interactions“



Prof. Volker Lipka

**Signal perception &
dynamic cellular defence
in plant innate immunity**



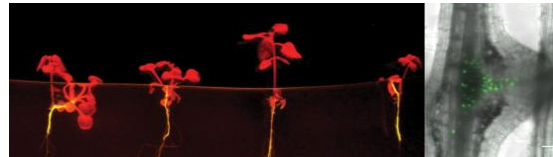
Dr. Thomas Spallek

Plant Biotic Interactions

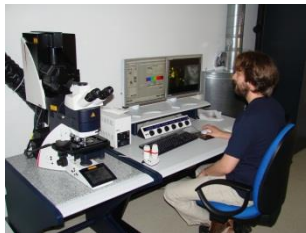


Prof. N.N.

Molecular Stress Physiology



Phtheirospermum japonicum
(hemiparasitic plant)
Model to study plant parasitism



„M.Bio.107 Biochemistry & Biophysics“



Prof. Ivo Feussner

**Biochemical analysis of
carbohydrates, lipids, proteins and nucleic acids
(HPLC / GC / GCMS / UPLCMS / ESIMS)
Plant biotechnology for production of renewable resources**



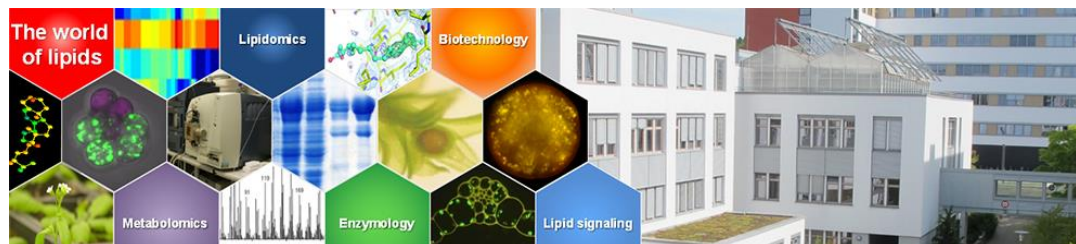
Prof. Claudia Steinem



Prof. Andreas Janshoff

**Spectroscopy of biomolecules
(fluorescence, FT-IR, CD, UV/Vis),
optical microscopy, scanning probe techniques**

- Plant primary and secondary metabolism → Metabolomics
- Lipid metabolism, enzymes of lipid metabolism and lipids as signal molecules
 - Modern biophysical methods for analysis of biomolecules
- Molecular biochemistry and biophysics of different classes of biomolecules
 - Functional analysis of membrane proteins

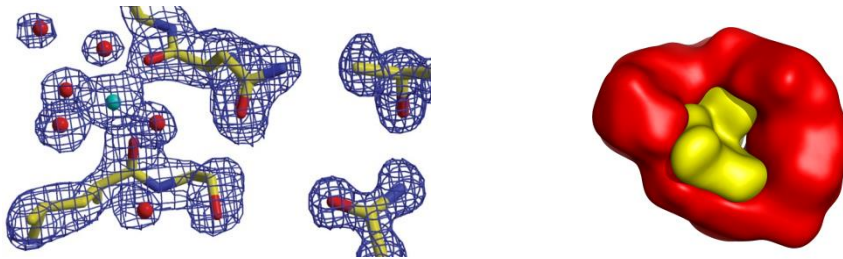


„M.Bio.106 Structural Biochemistry“

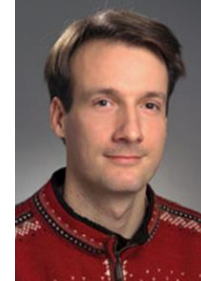


Prof. Ralf Ficner

Molecular structural biology
RNA processing & transport



Structure-function relationship
Protein-Protein interaction
Protein-RNA-DNA recognition
Structure-based drug design

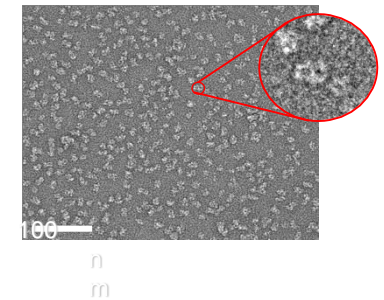
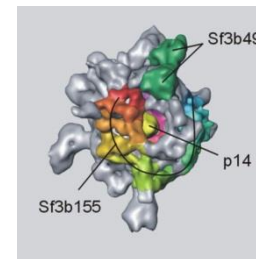


MAX-PLANCK-GESELLSCHAFT

MPI for Multidisciplinary Science

Prof. Holger Stark

3D Electron Cryomicroscopy



Methods in Structural Biology
X-ray crystallography
NMR spectroscopy
Electron Microscopy
Computational Methods

Profile module (12C)



module	number	structure and options		C/ module	C total
core module	3	lecture + seminar/tutorial + methods course	choice of 7 different modules	12	36
profile module	1	additional core module MLS core module DNB, MSc Chemistry interdisciplinary courses*		12	12

(flexibility option)

* permission of examination board required

examples for approved external profile modules:

University Uppsala, **Sweden**
University of Queensland, Brisbane, **Australia**
Sanford Burnham Medical Research Institute, San Diego, **USA**
Donnelly Center, Toronto, **Canada**
Sainsbury Laboratory, Norwich, **United Kingdom**
University of Exeter, **United Kingdom**
University of Aberdeen, **United Kingdom**
Massey University, **New Zealand**

Module M.MM.101 "Biomolecules and Pathogens" of Master program "**Molecular Medicine**" in **Göttingen**

Internships in departments of the **MPI for Multidisciplinary Science, Göttingen**

Internship in pharmaceutical or chemistry industry:

Henkel AG & Co, **Düsseldorf**, Bayer Crop Science, **Monheim**, DSM Nutritional Products, **Basel**, BASF, **Ludwigshafen**

Key Competence Module (2-12C)



module	number	structure and options		C/ module	C total
core module	3	lecture + seminar/tutorial + methods course	choice of 7 different modules	12	36
profile module	1	additional core module MLS core module DNB, MSc Chemistry interdisciplinary courses*		12	12
key competence module		course offer cross faculty, ZESS course offer MLS, Chemistry, DNB, BEE interdisciplinary courses*		2-12	12

e.g.

language courses

German language courses (6 C) for students with fair language skills (B1)

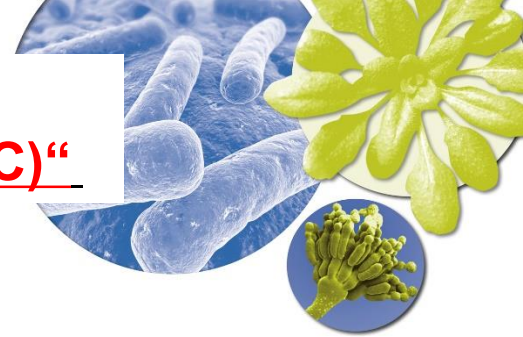
„Industry excursions“

MLS = Master „Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry“

DNB = Master "Developmental, Neural, and Behavioral Biology

BEE = Master "Biodiversity and Ecology"

ZESS = "Zentrale Einrichtung für Sprach- und Schlüsselkompetenzen,, (e.g. language courses)



Master Programme (M.Bio.150)

Key Competence Module “Industry excursion” (3C)“

- 3 days excursion: WS semester break
- visit of companies which hire molecular biologists/biochemists
- get an insight into the job of molecular biologist/biochemist in the industry

Master Programme (M.Bio.149)

Key Competence Module

“Planing and organization of Industry excursions (3C)“

- selection and contact of the companies
- travel organization: bus operators, youth hostel etc.

Admission requirements: participation in the core module M.Bio.102

“Molecular Genetics and Microbial Cell Biology“

West
North
South
East
South-East



2025

Industry excursion 2024 Göttingen



Plant breeding and seed company
KWS Saat AG Einbeck



Pharmaceutical company
Evotec, Göttingen



Global supplier of fragrances,
flavors, and ingredients for both
food and cosmetics, Holzminden



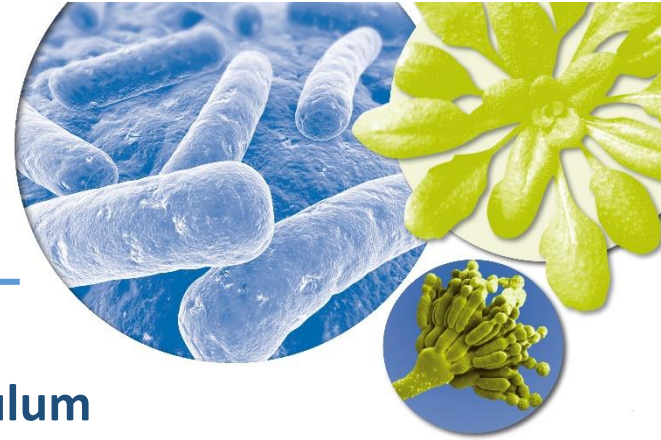
NextPharma contract
development and manufacturing
company. Production of high
variety of pharmaceutical dosage
forms which include solids,
liquids and semi-solids., Göttingen

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



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key competence module		course offer cross faculty, ZESS course offer MLS, Chemistry, DNB, BEE interdisciplinary courses*		2-12	12
advanced module	1	7 weeks lab course I		12	30
	1	7 weeks lab course II		12	
	1	scientific project management		6	
Master thesis (26 weeks)					30

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Curriculum

Basic structure

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Master thesis (26 weeks)					30

* Permission of examination board required

MLS = Master Molecular Life Sciences: Microbiology , Biotechnology and Biochemistry

DNB = Master Developmental, Neural and Behavioral Biology

BEE = Master Biodiversity, Ecology and Evolution

ZESS = Zentrale Einrichtung für Sprach- und Schlüsselkompetenzen

exemplary study plan	
core I	12
core II	12
key competence	6
profile	12
core III	12
key competence	6
advanced I	12
advanced II	12
scientific project management	6
Master thesis	30

PhD
(GAUSS)

Timetable winter term



		Lecture period														Lecture-free period	
		1	2	3	4	5	6	7	8	Xmas-break	9	10	11	12	13	14	
		27 Oct -28 Nov 2025					1 Dec 2025 - 16 Jan 2026 (christmas break 22 Dec - 02 Jan)					19 Jan - 20 Feb 2026					
Winter term	week	M.Bio.101 General and applied microbiology					M.Bio.102 Molecular genetics and microbial cell biology					M.Bio.108 Enzyme catalysis and biological chemistry				M.Bio.150 Industry excursion	
	block											M.Bio.105 Applied bioinformatics in molecular biosciences					
	weekly	free time slot for other faculties' lectures											(Fri, 08:15-09:45)				
		M.Bio 146 Applied methods of bioscience											by arrangement				
		M.Bio 149 Planning and organization of industry excursions											by arrangement				

Timetable summer term



Time/ Weekday	Monday	Tuesday	Wednesday	Thursday	Friday
8 - 9	M.Bio.107/147 Biochemistry and Biophysics (lecture)	M.Bio.104/144 Plant-microbe-IA (lecture)	Plant-microbe-IA (lecture)	M.Bio.107/147 Biochemistry and Biophysics (lecture/tutorial)	Structural Biochemistry (lecture/seminar)
9 - 10			Plant-microbe-IA (seminar)		
10 - 11			M.Bio.106/156 Structural Biochemistry (lecture)		
11 - 12					

	April	May	June	July	August
1 Sa		1 Mo	1 Do	1 Sa	1 Di
2 So		2 Di	2 Fr	2 So	2 Mi
3 Mo		3 Mi	3 Sa	3 Mo	3 Do
4 Di		4 Do	4 So	4 Di	4 Fr
5 Mi		5 Fr	5 Mo	5 Mi	5 Sa
6 Do		6 Sa	6 Di	6 Do	6 So
7 Fr		7 So	7 Mi	7 Fr	7 Mo
8 Sa	easter break	8 Mo	8 Do	8 Sa	8 Di
9 So		9 Di	9 Fr	9 So	9 Mi
10 Mo		10 Mi	10 Sa	10 Mo	10 Do
11 Di		11 Do	11 So	11 Di	11 Fr
12 Mi	M.Bio.104 Cellular and molecular biology of plant-microbe interactions	12 Fr	12 Mo	12 Mi	12 Sa
13 Do		13 Sa	13 Di	13 Do	13 So
14 Fr		14 So	14 Mi	14 Fr	14 Mo
15 Sa		15 Mo	15 Do	15 Sa	15 Di
16 So		16 Di	16 Fr	16 So	16 Mi
17 Mo		17 Mi	17 Sa	17 Mo	17 Do
18 Di		18 Do	18 So	18 Di	18 Fr
19 Mi		19 Fr	19 Mo	19 Mi	19 Sa
20 Do		20 Sa	20 Di	20 Do	20 So
21 Fr		21 So	21 Mi	21 Fr	21 Mo
22 Sa	22 Mo	22 Do	22 Sa	22 Di	
23 So	23 Di	23 Fr	23 So	23 Mi	
24 Mo	24 Mi	24 Sa	24 Mo	24 Do	
25 Di	25 Do	25 So	25 Di	25 Fr	
26 Mi	26 Fr	26 Mo	26 Mi	26 Sa	
27 Do	27 Sa	27 Di	27 Do	27 So	
28 Fr	28 So	28 Mi	28 Fr	28 Mo	
29 Sa	29 Mo	29 Do	29 Sa	29 Di	
30 So	30 Di	30 Fr	30 So	30 Mi	
	31 Mi		31 Mo	31 Do	

block methods courses

M.Bio.104

Cellular and molecular biology of plant-microbe interactions

M.Bio.107
Biochemistry or Biophysics

M.Bio.108
Structural Biochemistry



Welcome to Göttingen!

