DFG-Graduiertenkolleg GRK2599

Fine-Tuners of Adaptive Immune Responses

Friedrich-Alexander-Universität Erlangen-Nürnberg

Fast Track-Promotion

für Bewerbende mit biomedizinischen Bacherlorabschlüssen

DFG Deutsche Forschungsgemeinschaft

Bewerbung:	ab 1. März 2022
Frist:	4. April 2022
Interview:	1.- 4. Mai 2022
Beginn:	26. September 2022

DFG-Graduiertenkolleg GRK2599

Fine-Tuners of Adaptive Immune Responses

Friedrich-Alexander-Universität Erlangen-Nürnberg

Fast Track Docotoral Program

for applicants with Bachelor's degrees in biomedical sciences

DFG Deutsche Forschungsgemeinschaft

Online Application:	starting 1. March 2022
Deadline:	4. April 2022
Interview:	1.- 4. Mai 2022
Start:	26. September 2022

Research Training Group 2599

FAIR – Fine-Tuners of the Adaptive Immune Response

Concept

Hans-Martin Jäck

molecular immunology

Universitätsklinikum Erlangen

FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG

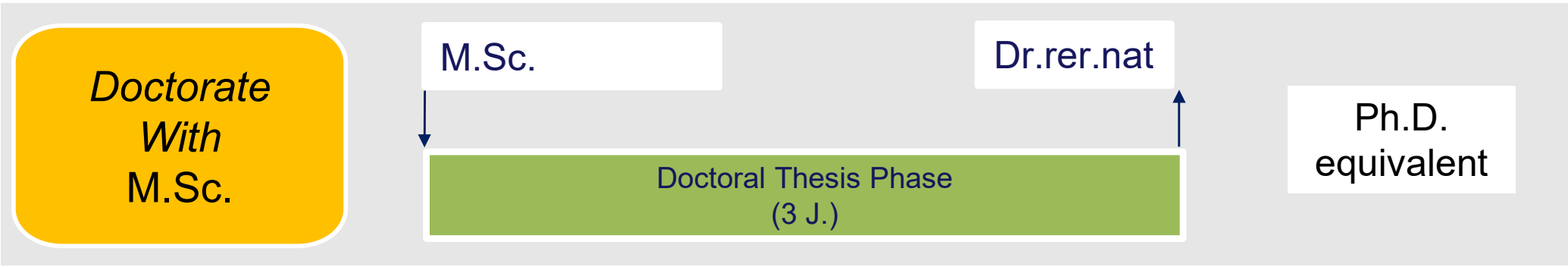
Doctoral Training Program

DFG
Deutsche
Forschungsgemeinschaft

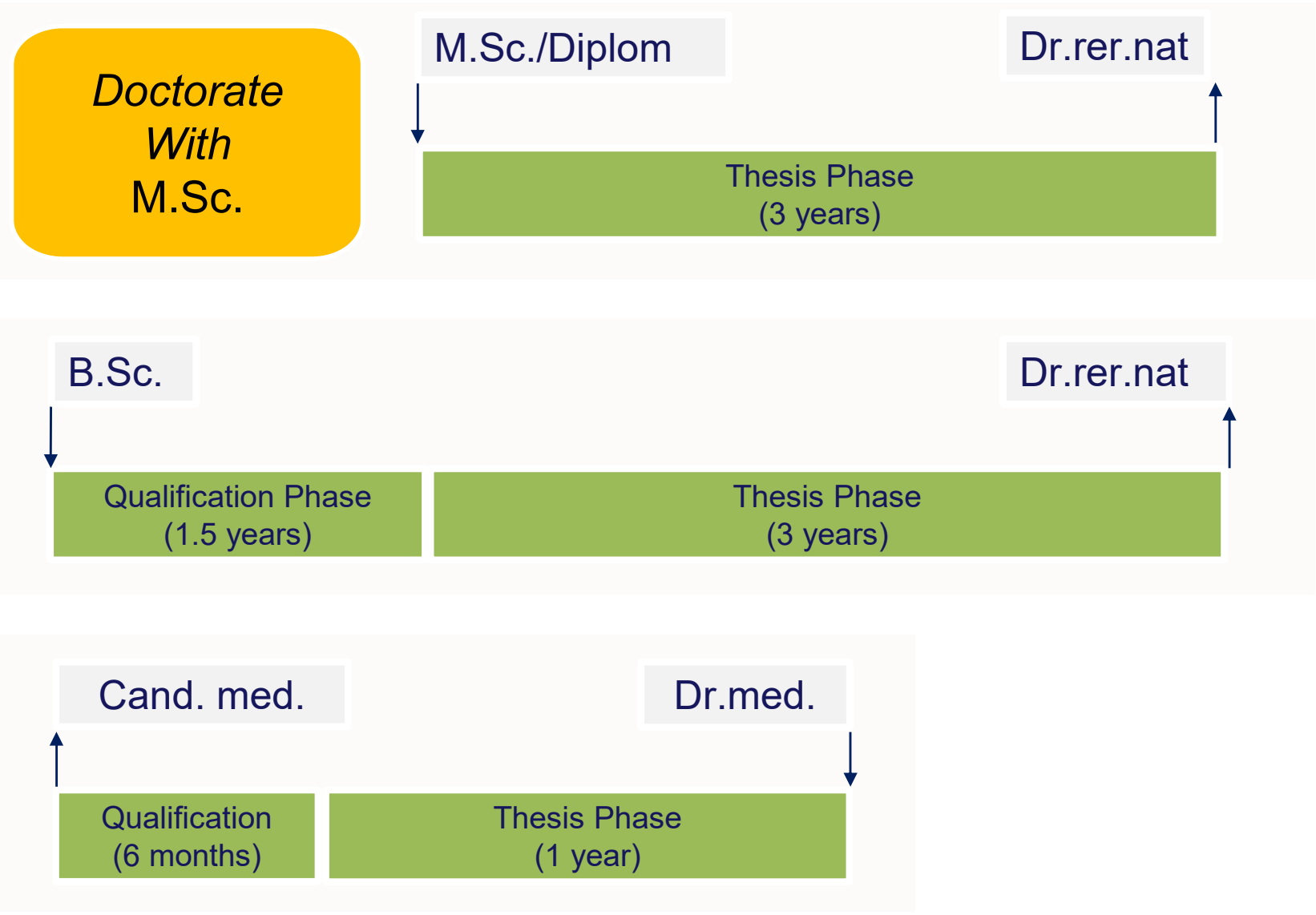
Doctoral Training Program

Research Training Group = *RTG*
Graduiertenkolleg = GRK

- Research
- Training
- Mentoring



Doctoral Cohorts



Fast Track - *Motivation*

Short-term

- Recruitment of excellent students
- Better preparation for the doctoral phase
- Maintaining the quality standards of education
- Shorter transition periods between the qualification phase and start of the doctoral thesis
  - ➢ *Shortening of the doctoral phase*
  - ➢ *Achievement of the research goal*

Long-term

- Increased international competitiveness
- Better trained young scientists
- Advancement and increased international visibility of the local and national research community

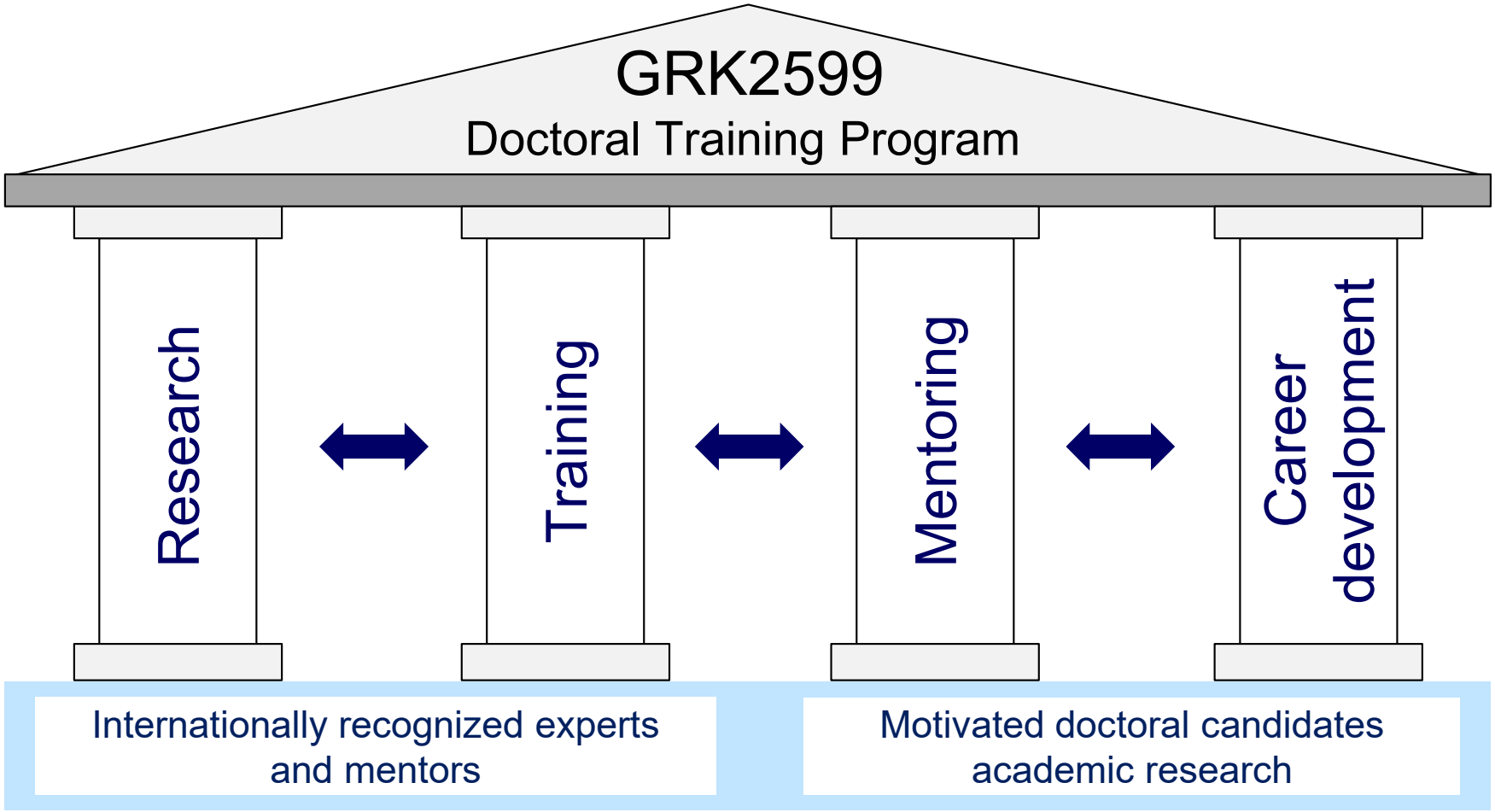
GRK2599 – *Goal*

Identify new regulators and fine-tuners of the adaptive immune response

Train skilled & competitive immunologists

Motivate graduates to further pursue academic research

Train physicians who can translate laboratory discovery into effective treatments



GRK2599 – *Principal Investigators*

Department BIOLOGIE

FAU FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG FACULTY OF SCIENCES

3 Genetics

Universitätsklinikum Erlangen

FAU FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG MEDIZINISCHE FAKULTÄT

3 Medicine 3
Rheumatology and Immunology

1 Dermatology

2 Medicine 1
Gastroenterology, Pneumology & Endocrinology

1 Microbiology
Clinical Microbiology, Immunology & Hygiene

1 Radiation Oncology

1 Infection Biology

2 Molecular Immunology

1 Immune Modulation

1. Dudziak, Diana
2. Gaipl, Udo
3. Jäck, Hans-Martin
4. Krönke, Gerhard
5. Lang, Roland
6. Mielenz, Dirk
7. Nitschke, Lars
8. Steinkasserer, Alexander
9. Vöhringer, David
10. Winkler, Thomas
11. Wirtz, Stefan
12. Hildner, Kai
13. Bozec, Aline
14. Steffen, Ulrike
15. Lux, Anja

▪ 15 Researchers

- ✓ *3 from the Depart. of Biology*
- ✓ *12 from 8 clinics and institutes at the university hospital*

▪ Selection Criteria

- ✓ *Fine-tuners of adaptive immunity*
- ✓ *Publications*
- ✓ *Extramural funding*
- ✓ *Teaching experience*

https://www.fau.eu/research/

Immunology@Erlangen – *Short distances*

GRK2599
FAIR

Department of Clinical Microbiology

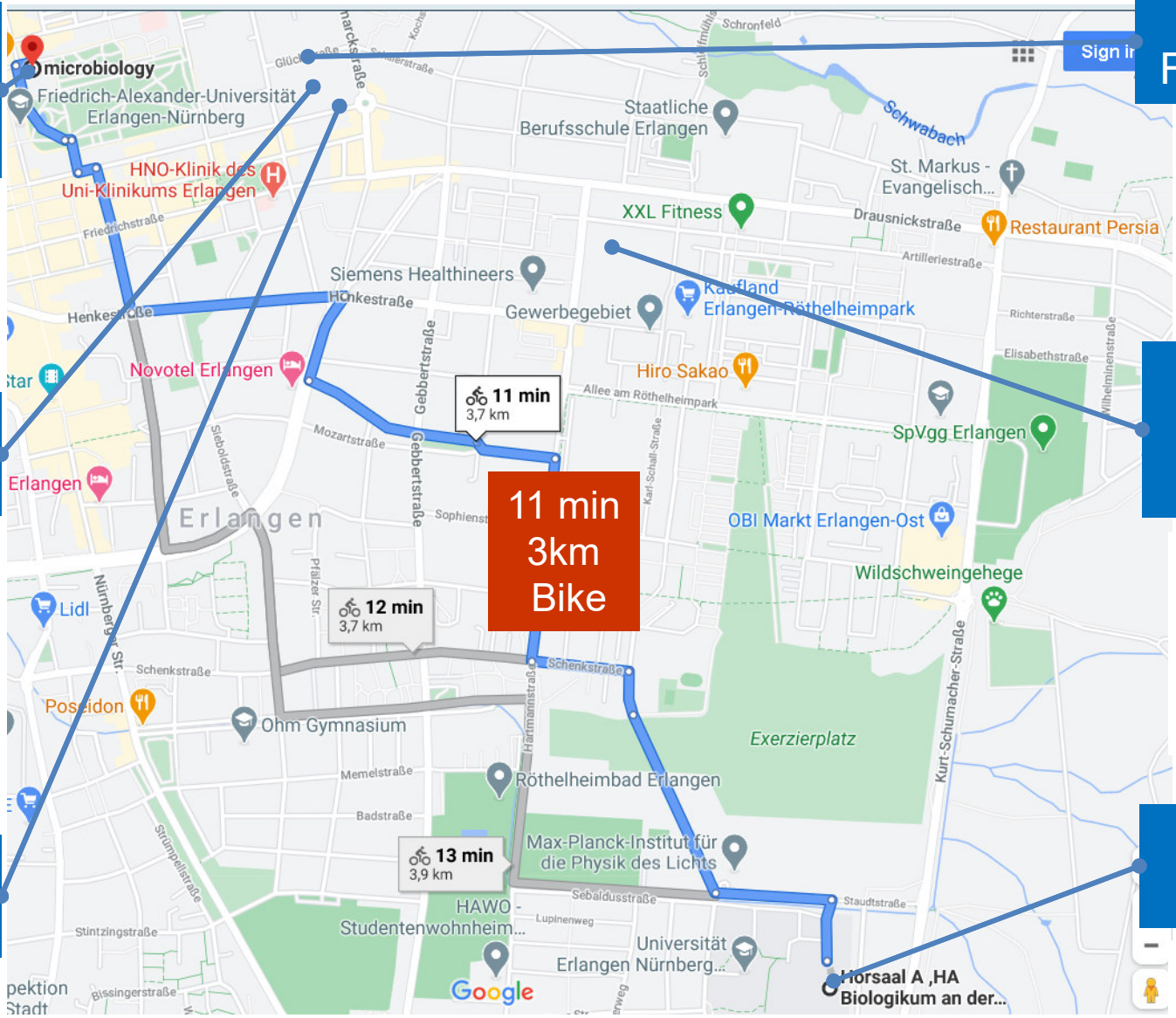
- Lang
- Vöhringer

Internal Medicine 3

- Bozek
- Krönke
- Steffen

Radiation Biology

- Gaipl



Nikolaus-Fiebiger Center

- Jäck
- Mielenz
- Winkler
- GRK office

Kussmaul Research Campus

- Wirtz
- Hildner
- Mougiakakos
- Dudziak
- Steinkasserer

Department of Biology

- Nitsche
- Lux

GRK2599 – Goal

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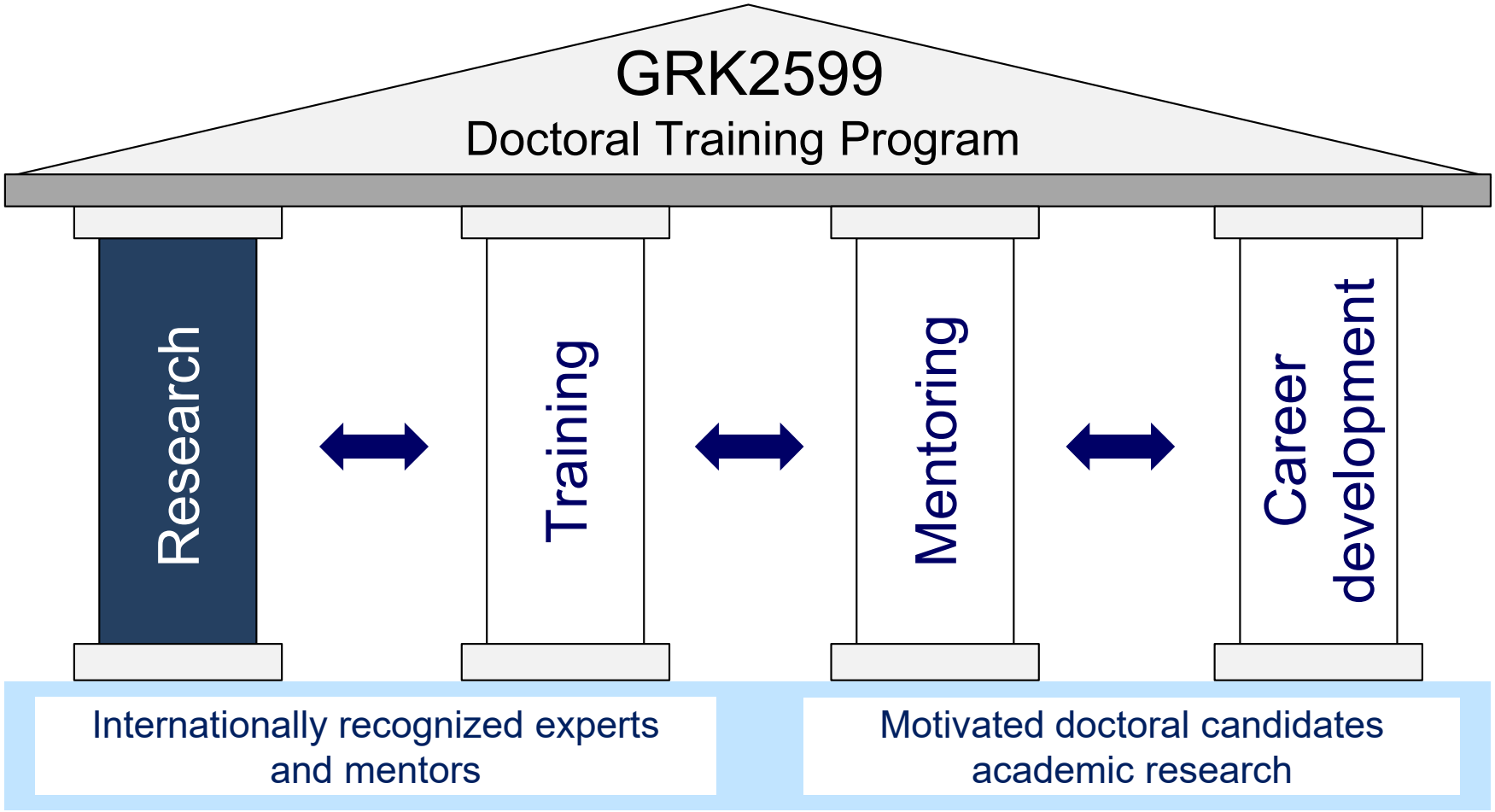
Motivate graduates to further pursue academic research

Teach physicians who can translate laboratory discovery into effective treatments



GRK2599 – *Research Goals*

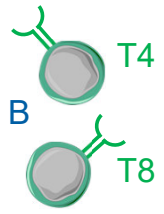
15 hypothesis-driven thesis projects that address the role of factors

- Metabolites: 5, 14
- Cytokines: 7
- Receptors: 1, 2, 3, 4, 10, 12, 14
- TF: 9, 11, 13, 15, 16
- Ab Glycosylation: 4, 17
- Ig/Ag complex: 4, 17

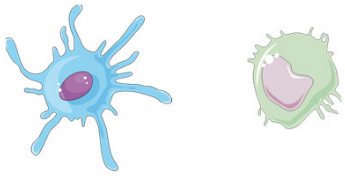
Fine-tuners

- activate
- differentiate
- regulate

Adaptive cells



Innate cells



Adaptive immune response and memory

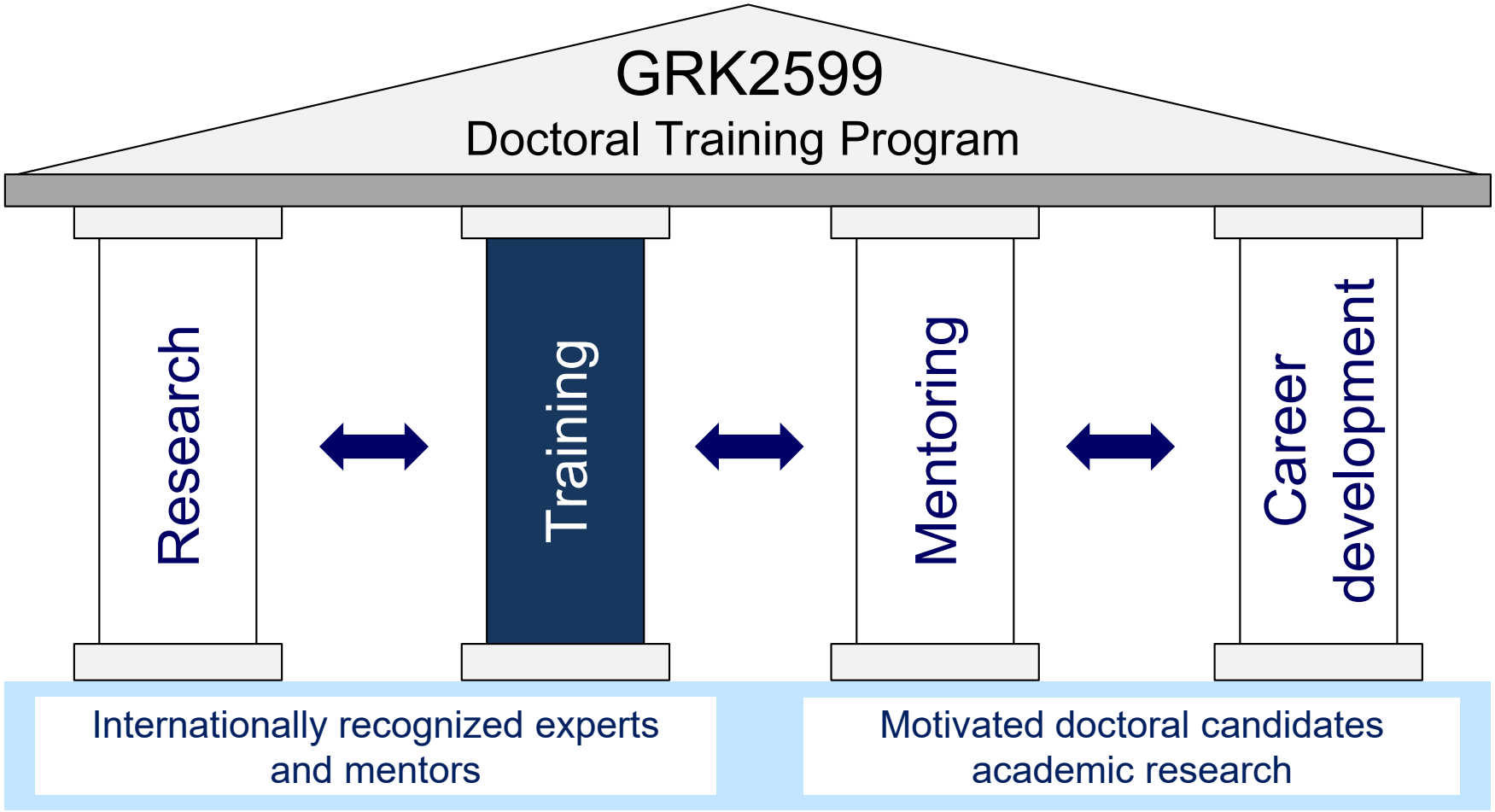
GRK2599 – *Goal*

Identify new regulators and fine-tuners of the adaptive immune response

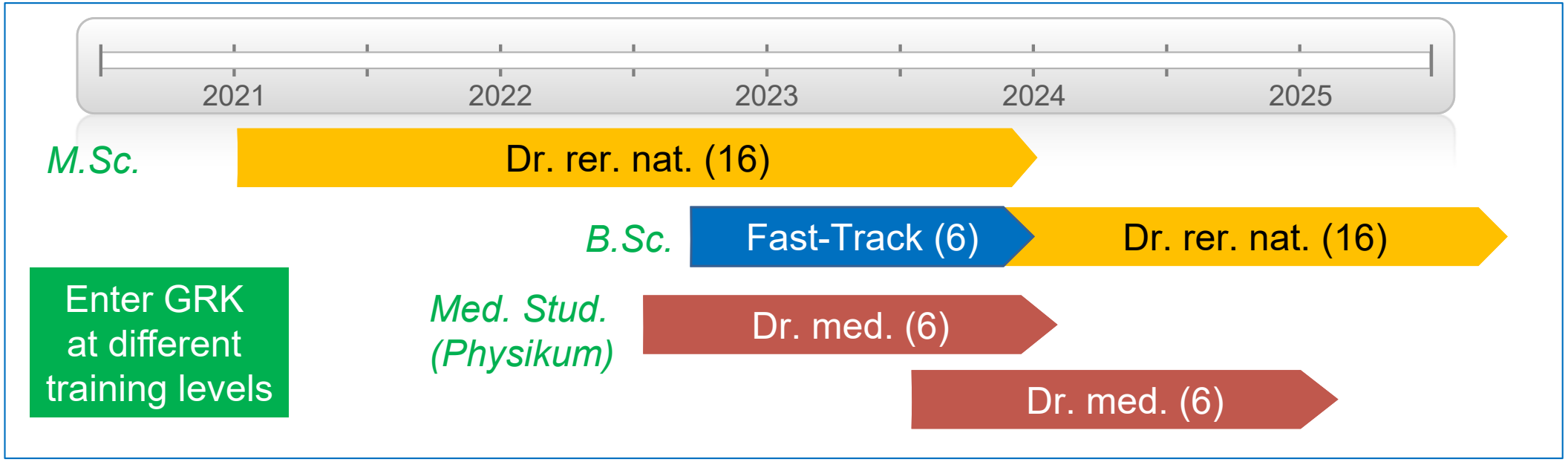
Train skilled & competitive immunologists

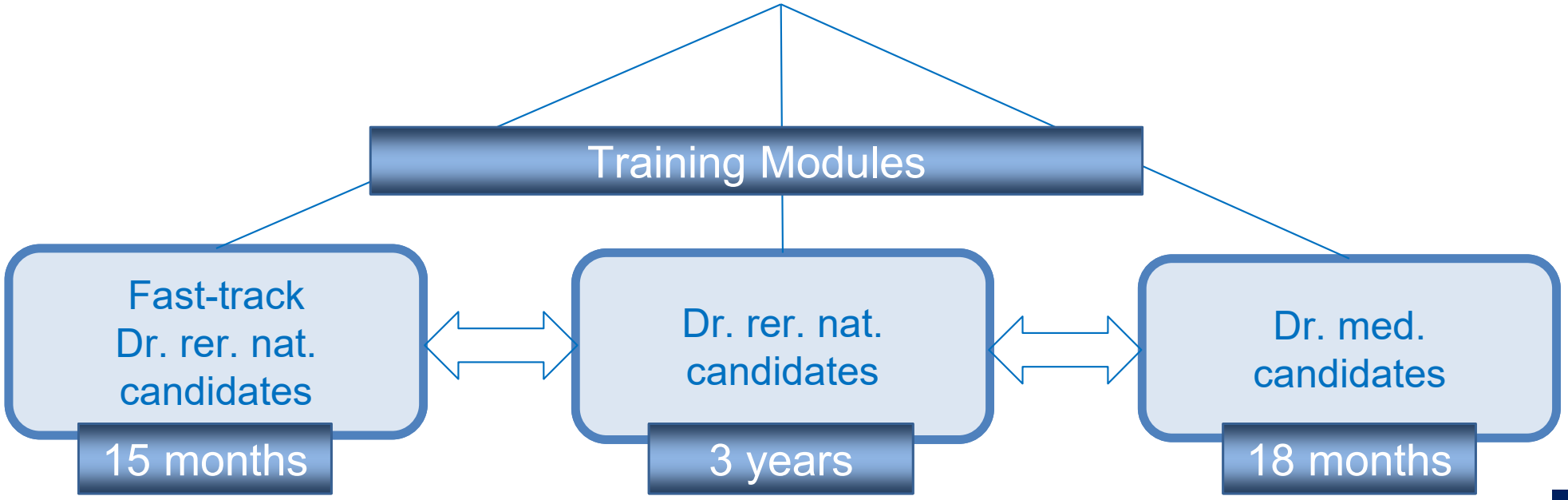
Motivate graduates to further pursue academic research

Produce physicians who can translate laboratory discovery into effective treatments

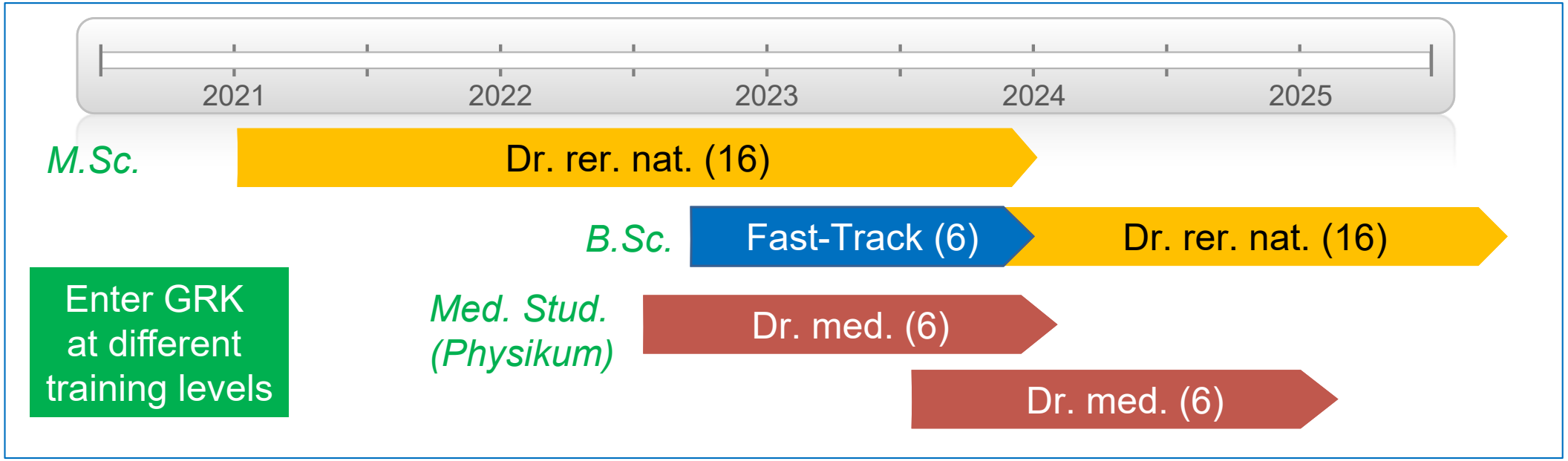


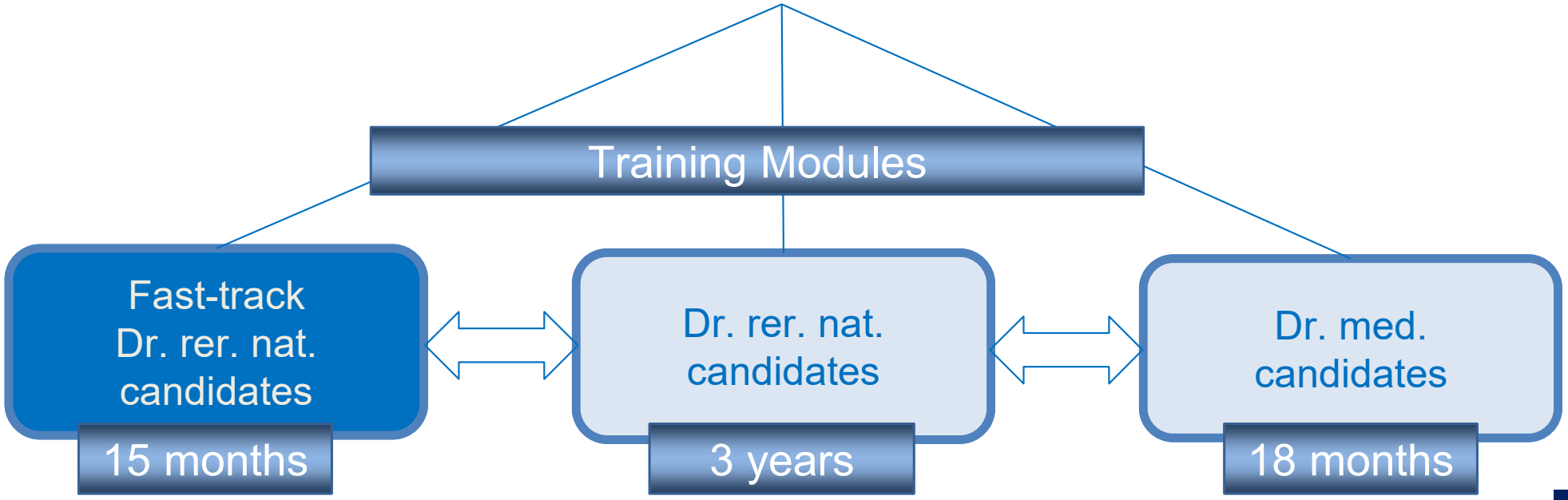
GRKTG2599 – *Training Modules*



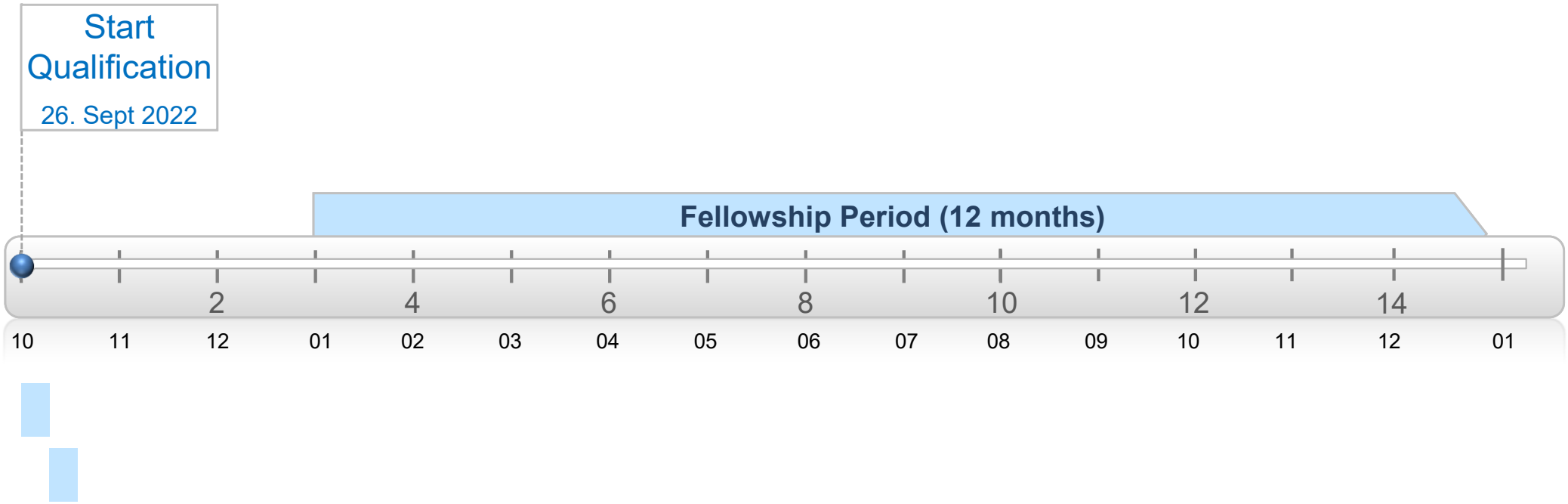


GRKTG2599 – *Training Modules*





Training Concept – *Fast-Track candidates*



Immunology Autumn School

10th Autumn School *Current Concepts in Immunology* — **PROGRAM 2018**

Time	Sunday 07. October	Monday 08. October	Tuesday 09. October	Wednesday 10. October	Thursday 11. October	Friday 12. October
09:00 09:30	Arrival & Registration (starting at 3pm)	Hans-Martin Jäck	Diana Dudziak	Wolfgang Schuh	Dirk Haller	Departure
		Overview Immunity (30 min)	How dendritic cells activate T cells (30 min)	How mature B cells develop (30 min)	Microbiome and immunity (30 min)	
09:45 10:15		Stefan Bauer	Ludger Klein	Hans-Martin Jäck	Claudia Traidl-Hoffmann	
		How innate Immunity protects I (30 min)	How T cells develop (30 min)	How B cells produce antibodies (30 min)	Allergy (30 min)	
10:30		Break	Break	Break	Break	
10:50 11:20		Olaf Groß	Hyun-Dong Chang	Hans-Martin Jäck	Birgit Sawitzki	
		How innate immunity protects II (30 min)	Effector CD4 T cells (30 min)	B cells beyond antibodies (30 min)	Metabolism of immune cells (30 min)	
11:35 12:05		Axel Roers	Jochen Hühn	Thomas Kamradt	Ulf Grawunder	
		How cells recognize foreign DNA/RNA (30 min)	How T cells regulate immunity (30 min)	Autoimmune diseases (30 min)	Onco-immunology (30 min)	
12:20						
13:00		Lunch &Meet-the-speakers	Lunch & Meet-the-speakers	Lunch & Meet-the-speakers	Lunch & Meet-the-speakers	
14:15		Meet the companies (14:15 - 15:45)	Free time	Free time	Free time	
15:30 16:00		Break	Sandra Beer-Hammer How T cells kill (30 min)	Round Table Discussion Groups *Animal research* Moderators: Kamradt/Beer-Hammer	Louis Du Pasquier (Beginn 15:00) How the immune system evolved (40 min)	
16:15 16:45		Roland Lang	Carsten Watzl	*Flow cytometry* Moderators: Schuh/Chang	TBA	
		Macrophages & Granulocytes (30 min)	How innate lympocytes help and kill (30 min)	*CRISPR/Cas* Moderator: Engels/Buch	Special Event	
17:00	Welcome		Break	Break	Break	
17:30 18:15	Klaus Heeg	Nigel Kileen	Thorsten Buch	Michael Sixt		
	Discovery of Cytokines (40 min)	Cellular Immunotherapy (40 min)	CRISPR/Cas and Transgenic mice (40 min)	How immune cells move (40 min)		
18:30	Dinner	Dinner & Meet-the-speakers	Dinner & Meet-the-speakers	Dinner & Meet-the-speakers	Dinner & Meet-the-speakers	
20:00 22:00	Get together	Poster Session I	Free time	Poster Session II	10 Years Autumn School	

Immunology Autumn School

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An up-to-date
everyone inclu
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presentations
to foster netwo

Key Note

Klaus Heeg (Heide
Michael Sixt (Aust
Thorsten Buch (Mü
Nigel Kileen (San F

Faculty

Stefan Bauer
Hyun-Dong Chang
Diana Dudziak
Louis Du Pasquier
Niklas Engels
Ulf Grawunder
Dirk Haller
Jochen Hühn
Ludger Klein
Roland Lang
Axel Roers
Claudia Traidl-Hoff
Carsten Watzl

10th

Curren

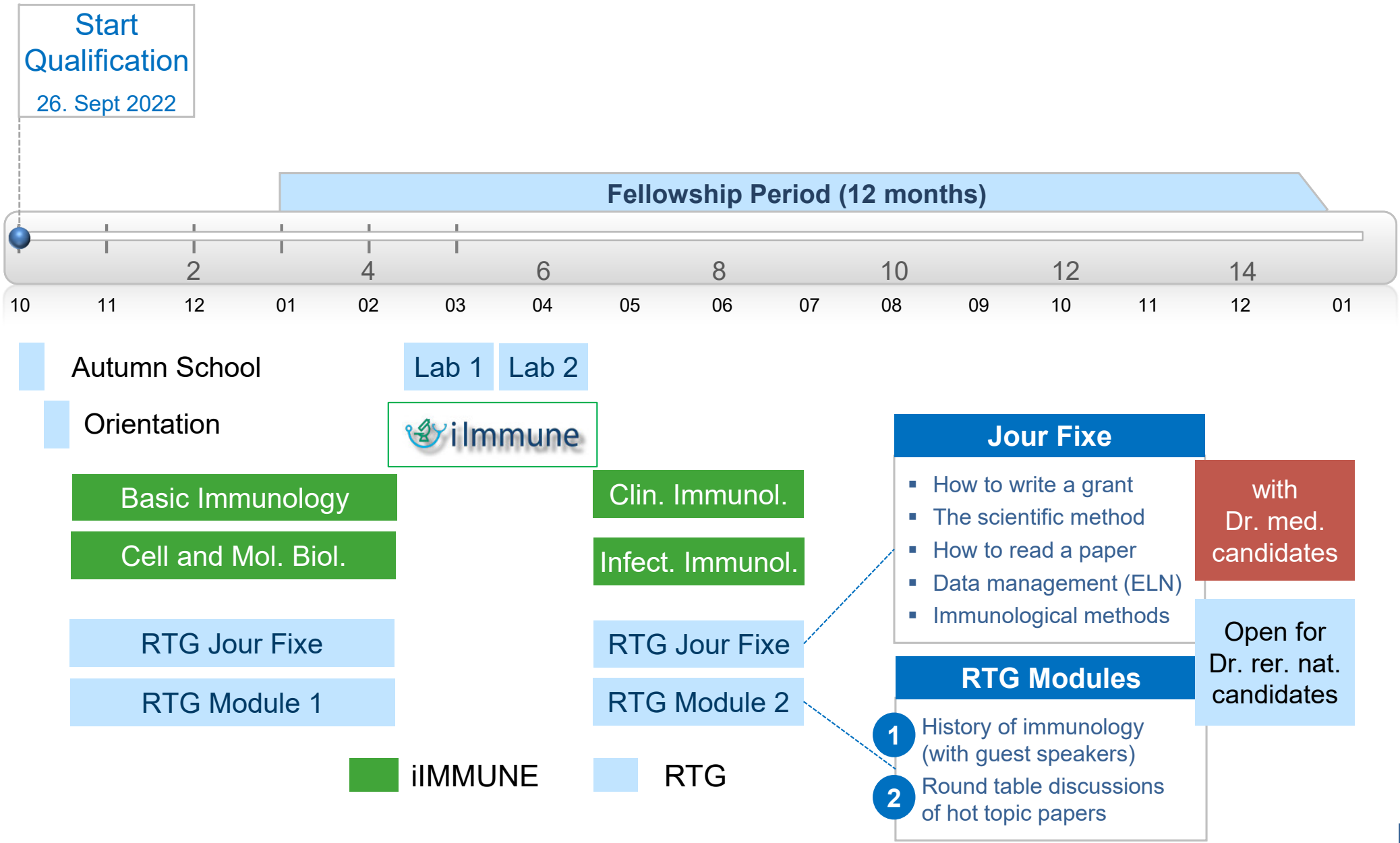
October 07

Monday 08. October	Tuesday 09. October	Wednesday 10. October	Thursday 11. October
Hans-Martin Jäck	**Diana Dudziak**	**Wolfgang Schuh**	**Dirk Haller**
Overview Immunity (30 min)	*How dendritic cells activate T cells (30 min)*	*How mature B cells develop (30 min)*	*Microbiome and immunity (30 min)*
Stefan Bauer	**Ludger Klein**	**Hans-Martin Jäck**	**Claudia Traidl-Hoffmann**
How innate Immunity protects I (30 min)	*How T cells develop (30 min)*	*How B cells produce antibodies (30 min)*	*Allergy (30 min)*
Break	Break	Break	Break
Olaf Groß	**Hyun-Dong Chang**	**Hans-Martin Jäck**	**Birgit Sawitzki**
How innate immunity protects II (30 min)	*Effector CD4 T cells (30 min)*	*B cells beyond antibodies (30 min)*	*Metabolism of immune cells (30 min)*
Axel Roers	**Jochen Hühn**	**Thomas Kamradt**	**Ulf Grawunder**
How cells recognize foreign DNA/RNA (30 min)	*How T cells regulate immunity (30 min)*	*Autoimmune diseases (30 min)*	*Onco-immunology (30 min)*

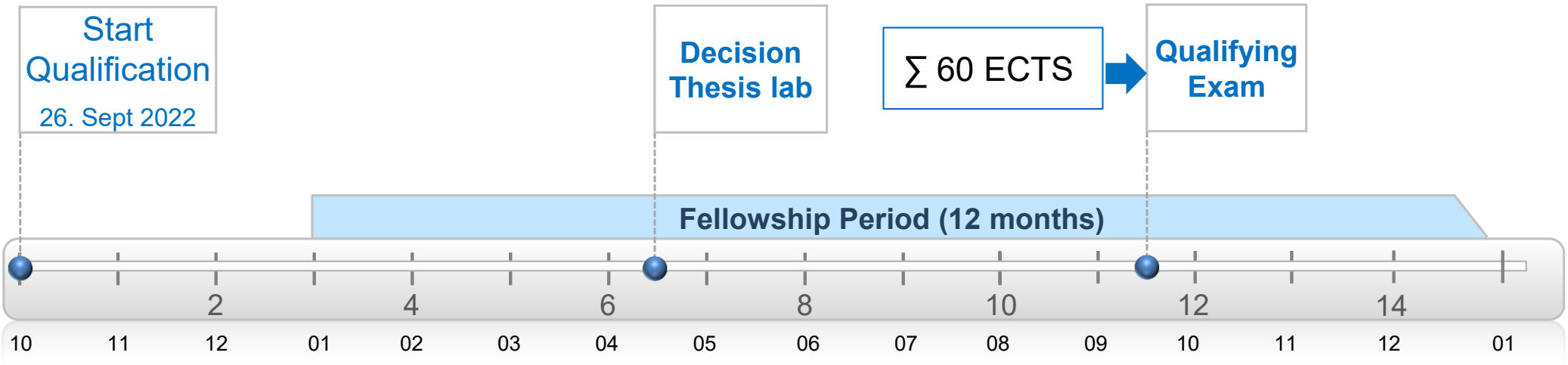
PROGRAM 2018

Thursday 11. October	Friday 12. October
Dirk Haller	Departure
Microbiome and immunity (30 min)	
Claudia Traidl-Hoffmann	
Allergy (30 min)	
Break	
Birgit Sawitzki	
Metabolism of immune cells (30 min)	
Ulf Grawunder	
Onco-immunology (30 min)	
Lunch & Meet-the-speakers	
Free time	
Louis Du Pasquier (Beginn 15:00)	
How the immune system evolved (40 min)	
TBA	
Special Event	
Break	
Dinner & Meet-the-speakers	
10 Years Autumn School	

Training Concept – *Fast-Track candidates*



Training Concept – *Fast-Track candidates*



Autumn School

Orientation

Lab 1 Lab 2

iImmune

Basic Immunology

Cell and Mol. Biol.

Clin. Immunol.

Infect. Immunol.

RTG Jour Fixe

RTG Module 1

RTG Jour Fixe

RTG Module 2

iIMMUNE RTG

Jour Fixe

- How to write a grant
- The scientific method
- How to read a paper
- Data management (ELN)
- Immunological methods

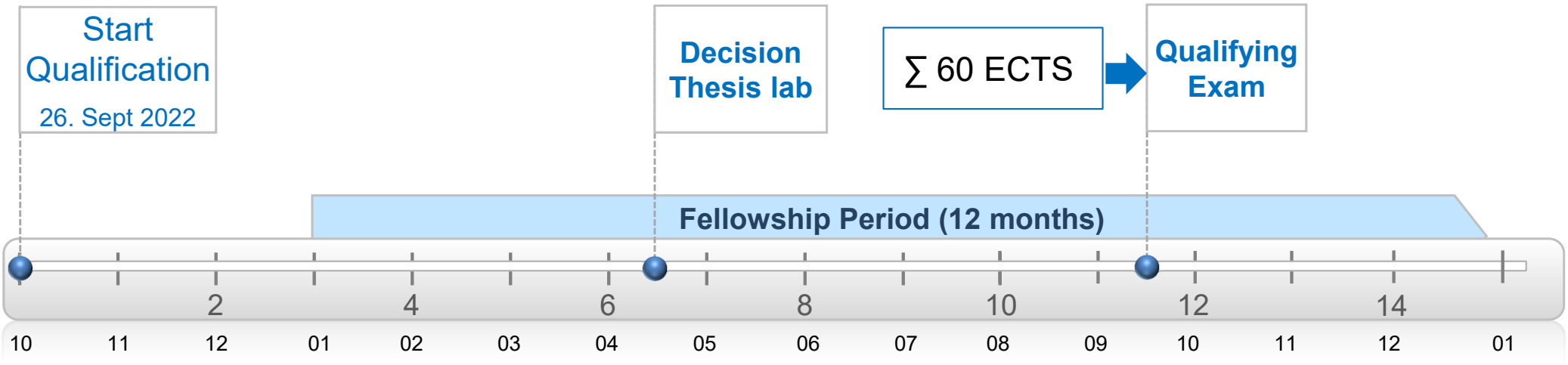
with Dr. med. candidates

Open for Dr. rer. nat. candidates

RTG Modules

1. History of immunology (with guest speakers)
2. Round table discussions of hot topic papers

Training Concept – *Fast-Track candidates*



Autumn School

Orientation

Lab 1

Lab 2

Ext. Lab Rot.

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RTG2599 – *International Partners*

EXTERNAL LAB ROTATIONS: International Partners

38

Europe (19)

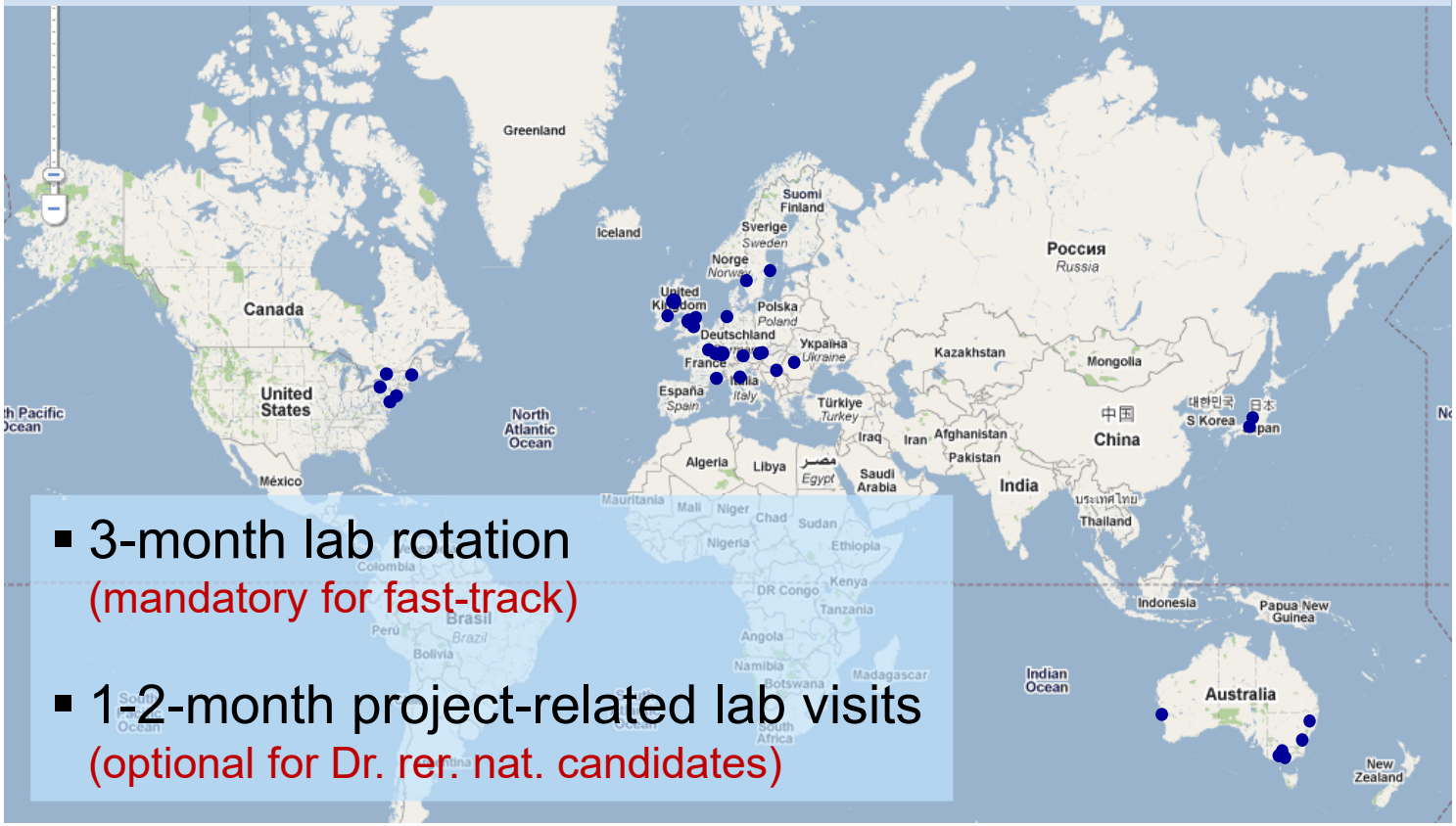
USA (5)

Japan (2)

Australia (10)

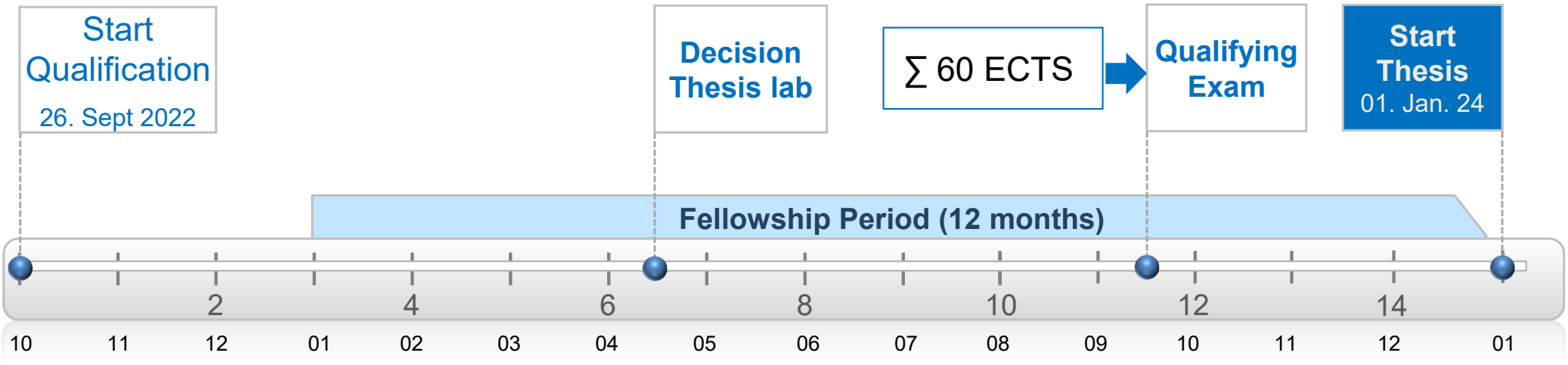
Canada (2)

RTG2599 - Financed External Lab Rotations



- 3-month lab rotation
  (mandatory for fast-track)
- 1-2-month project-related lab visits
  (optional for Dr. rer. nat. candidates)

Training Concept – *Fast-Track candidates*



Autumn School

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iImmune

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RTG Jour Fixe

RTG Module 1

RTG Jour Fixe

RTG Module 2

iIMMUNE RTG

Jour Fixe

- How to write a grant
- The scientific method
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- Immunological methods

with Dr. med. candidates

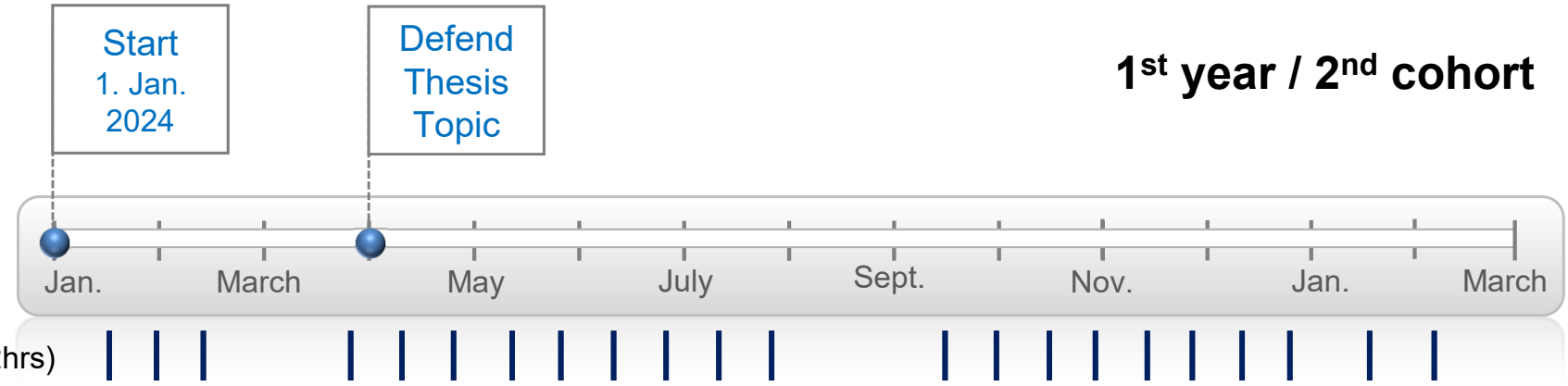
RTG Modules

1. History of immunology (with guest speakers)
2. Round table discussions of hot topic papers

Open for Dr. rer. nat. candidates

Training Concept – *Dr. rer. nat. candidates*

Workload
(obligatory)
- 2-3 hrs/wk
- 10-12 days



Paul-Ehrlich Club

- Guest speakers
- Discuss hot papers
- Organize events, e.g., DOI and mini symposium
- State-of-the-art methods
- Data management (ELN)

Workshop 1 & Others

- Biostatistics
- Good Practice
- Scientific Writing
- Minisymposium
- Data management
- ELN

Softskill Courses

- Debate club
- Job application
- Career Day
- Company visit
- Poster design
- Communication
- Effective presentations

Science-related Courses

- Flow course
- Bed-side visits
- Bioinformatics
- Design clinical trials
- Animal in research
- External lab rotations

Training Concept – *Meetings*

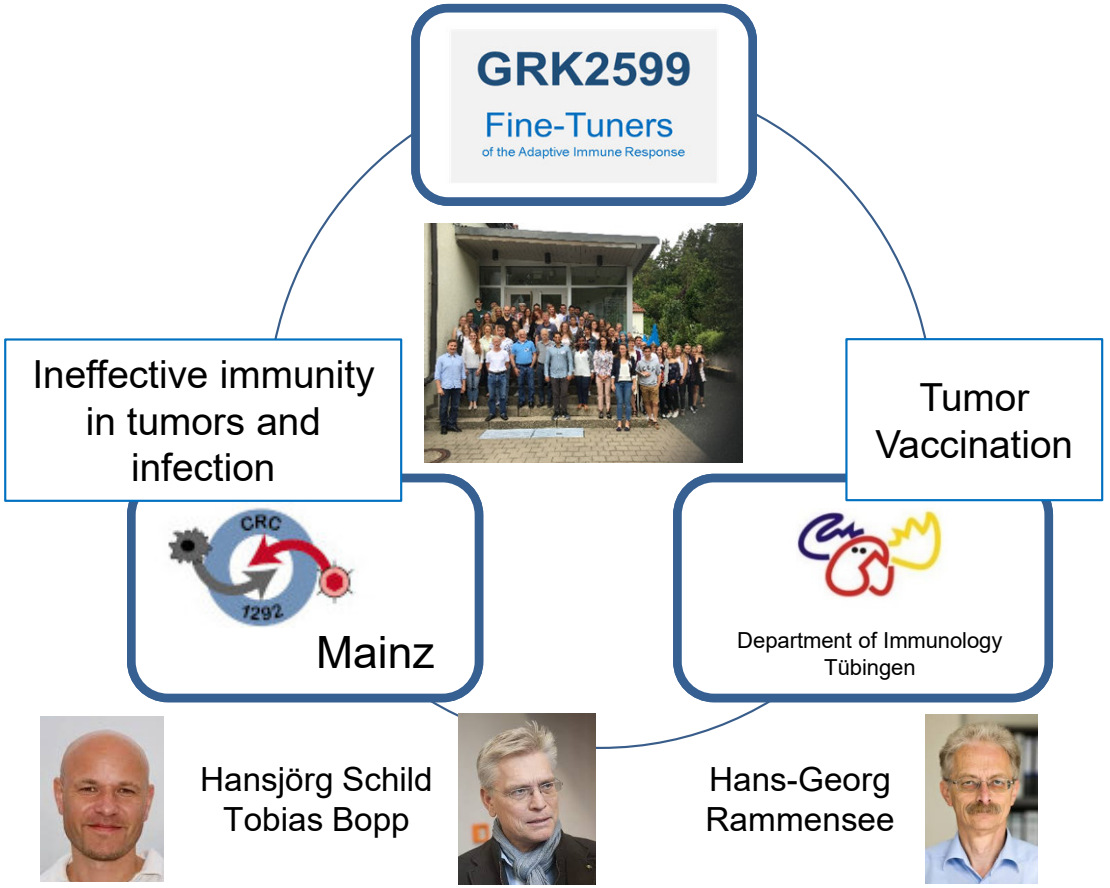
Annual Internal GRK Retreat

Annual RTG Network Meeting

Training Concept – *Meetings*

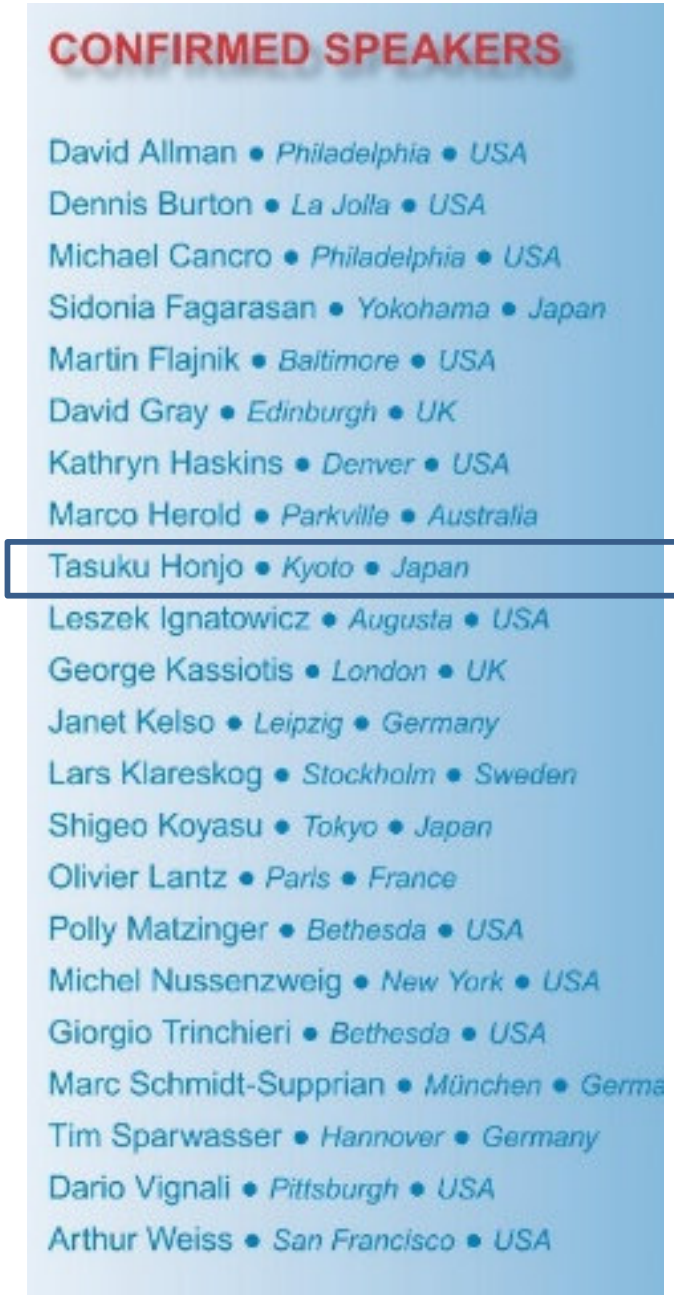
Annual Internal GRK Retreat

Annual RTG Network Meeting



Training Concept – *Meetings*

International GRK Symposium (2023)



2018

Training Concept – *Meetings*

International GRK Symposium (2022)

GRK Mini Symposia

Training Concept – *Meetings*

DGfI Autumn School

Other Meetings

GRK2599 – *Goal*

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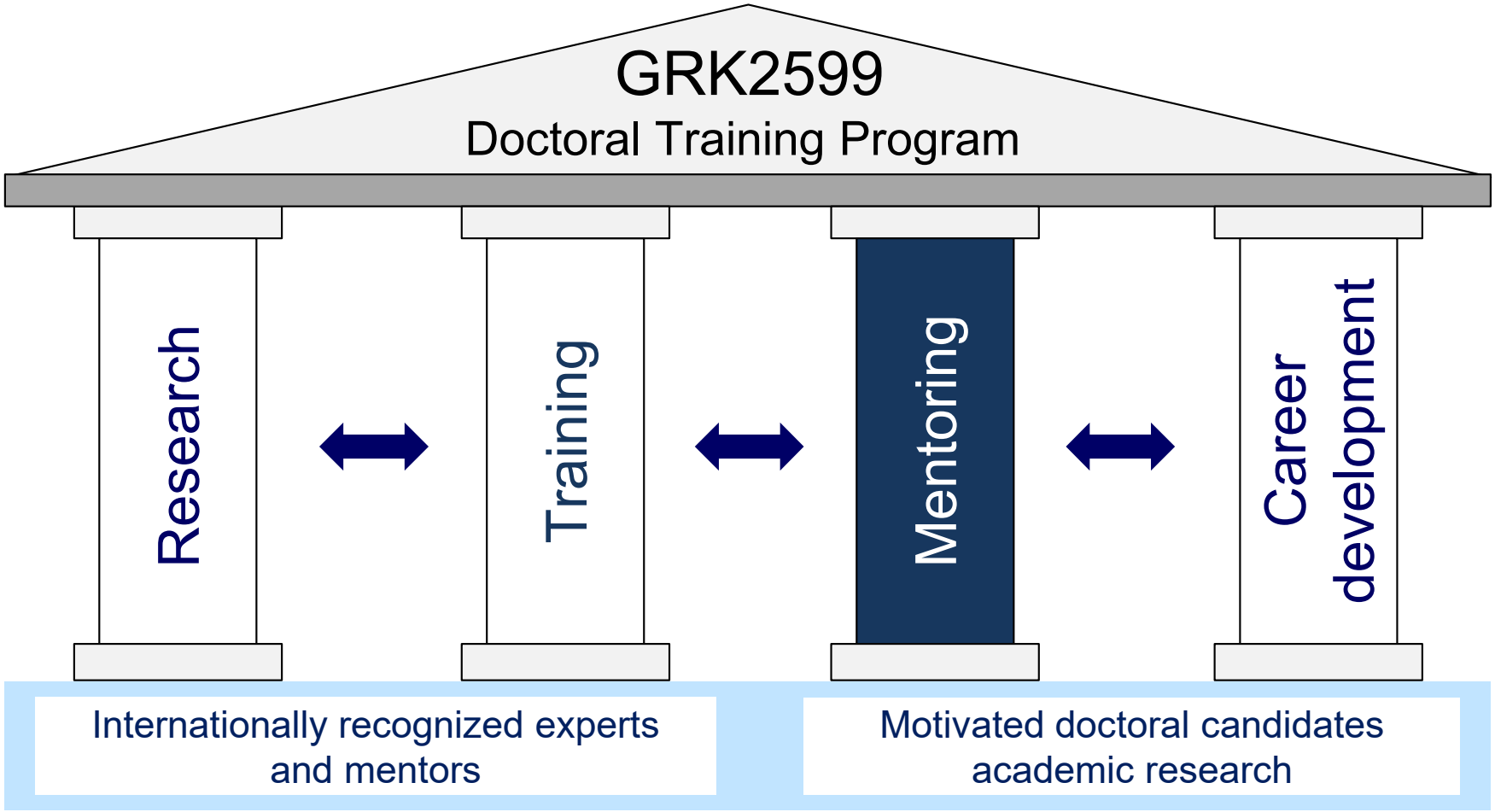

GRK2599 - *Supervision & Mentoring*

Qualification Phase

For Fast-Track and Dr. med. candidates

- Assigned advisors
  - *One GRK PI as mentor*
  - *GRK speaker and vice-speakers*
  - *GRK coordinator*
- Duties
  - *Advice on course selection & lab internship abroad*
  - *Any other questions*

Dissertation Phase

For all doctoral candidates

- Thesis advisory committee (TAC)
  - *3 GRK PIs suggested by candidate*
  - *1-2 times per year*
- GRK coordinator

Supervision – *Control of Thesis Progress*

- Defense of the doctoral project ("DFG" proposal)
- Yearly Meetings with thesis advisory committee (TAC)
- Oral or poster presentations at
  - *Annual internal retreats*
  - *Annual RTG network meeting*

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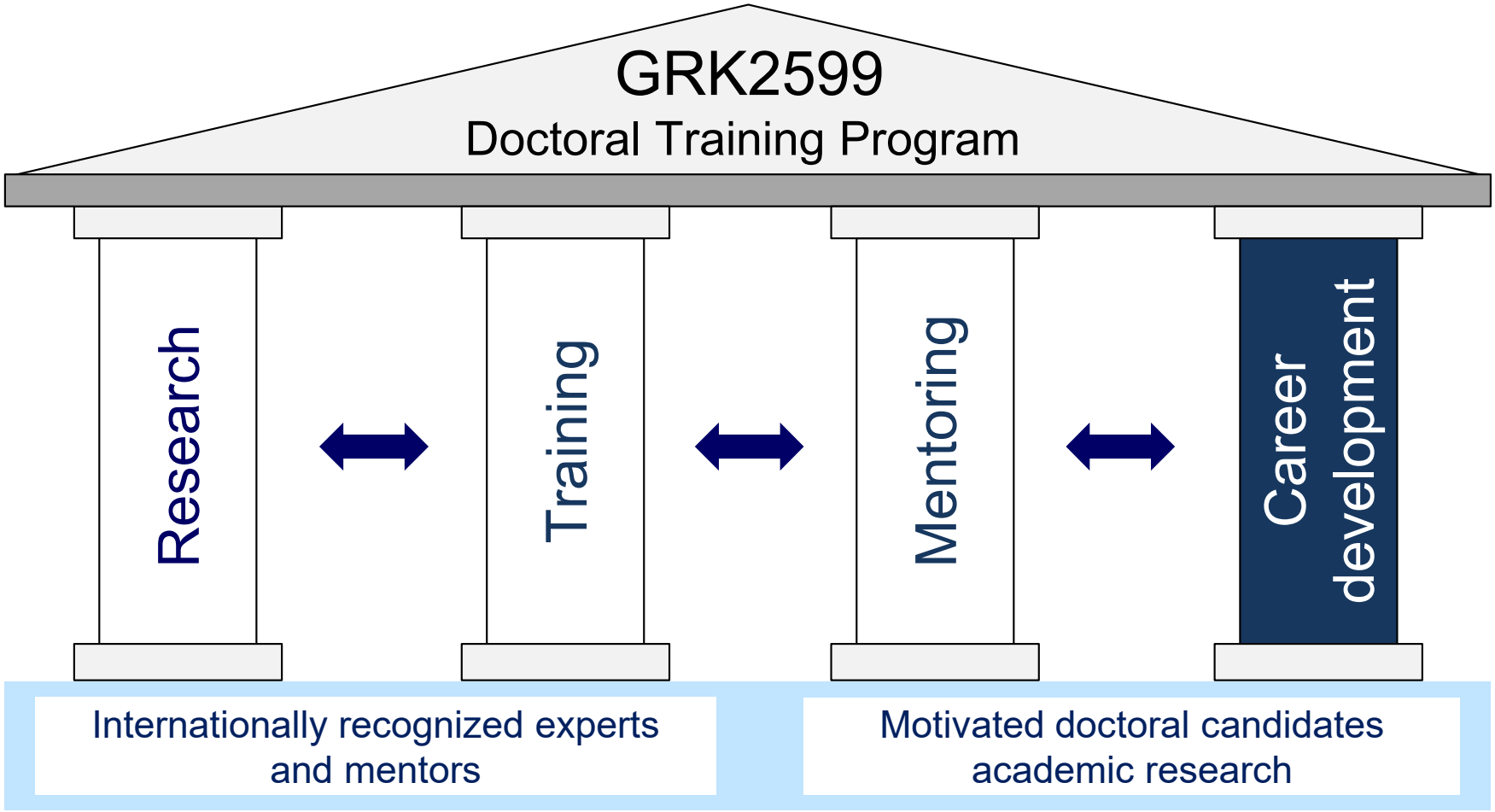
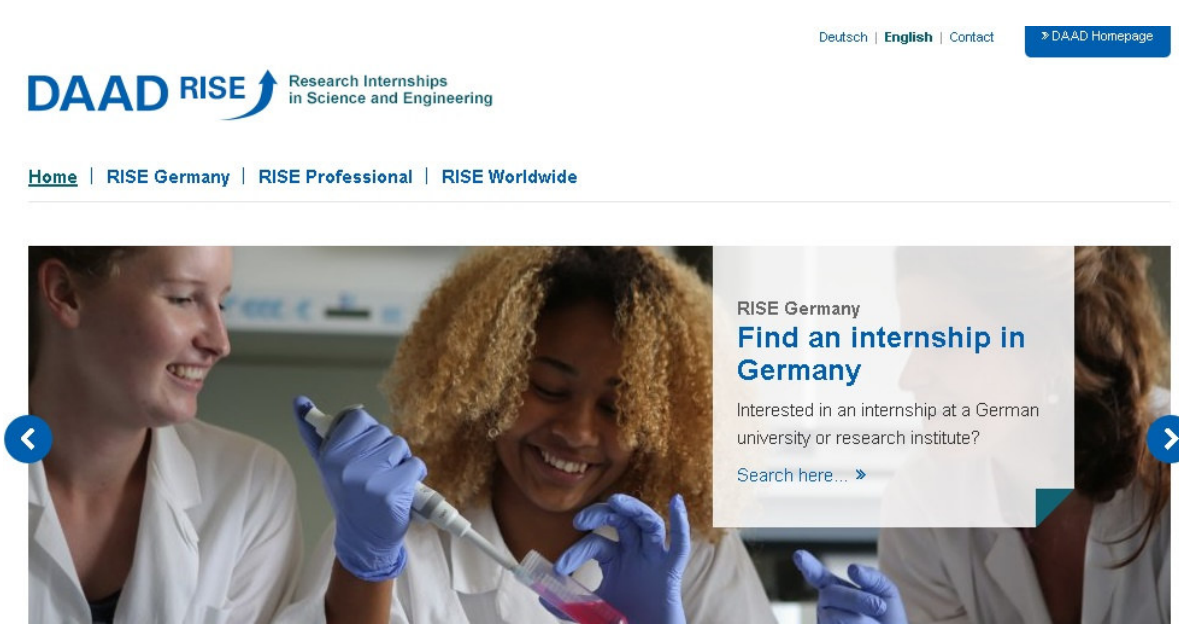


GRK2599 - *Career Development*

- Improve **paper and grant writing** proficiencies
- Acquire **mentor expertise** through supervision of students
- Develop **management skills** by organizing GRK events
- Acquire **decision-making expertise** by membership in GRK steering committee
- Build **professional networks** through company visits, international internships, attending meetings and visiting potential post-doc labs
- **Prepare for job interviews** through career-relevant workshops

- Improve **paper and grant writing** proficiencies
- Acquire **mentor expertise** through supervision of students



GK1660 ADAPTIVE IMMUNITY Erlangen

Universitätsklinikum Erlangen | Friedrich-Alexander-Universität Erlangen-Nürnberg

DFG-Graduiertenkolleg 1660
Schlüsselsignale der Adaptiven Immunantwort

Graduate School GK1660
Prof. Dr. rer. nat. Hans-Martin Jäck

Contact Information
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University Hospital Erlangen
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tobit.steinmetz@uk-erlangen.de

Project Aim and Methods
Antibodies are secreted by plasma cells (PC) that are generated in the periphery and migrate to the bone marrow to establish a long lived pool. The terminal differentiation of B lymphocytes into PC is controlled by a network of transcription factors that cross-regulate each other. RNAseq data have established a plasma cell signature and revealed many unknown genes to be up- or down-regulated in plasma cells. Elucidation of the function of these genes will help to understand the cell biology of PC that is required to support antibody production. PC differentiation and antibody secretion are tightly interlinked with ER quality control and autophagy. We seek to address the concept of cell biological remodeling of PC in relation to antibody secretion and quality control with a particular focus on a gene that is up-regulated in PC, the Tropomyosin receptor kinase (Trk) fused gene (Tfg). Tfg functions in ER/Golgi transport and organization and regulation of cell size, both of which increase during plasma cell differentiation. Our preliminary data obtained in Crispr/Cas-targeted CH12 murine lymphoma and MOPC104E plasmacytoma cells have revealed three phenotypes: Tfg knock-out (KO) 1. decreases survival, 2. increases basal autophagy and 3. sensitizes cells towards ER stress. We generated mice carrying a constitutively targeted null allele of Tfg (TfgKO) but we were not able to obtain homozygous TfgKO offspring. Yet, already Tfg heterozygous mice show decreased serum IgA and reduced PC numbers in Peyer's patches and trends towards reduced IgM and PC numbers in various organs. We hypothesize that Tfg is important for PC homeostasis in vivo by regulating ER quality control and autophagy. We want to determine how Tfg prevents apoptosis, ER stress and autophagy in targeted CH12 and MOPC104E cells. We will also generate and analyze PC generation and function in mice carrying a B cell specific deletion of Tfg by establishing and crossing $Tfg^{fl/fl}$ mice with mb1-Cre and CD23-Cre mice. The results of this project will increase our understanding of plasma cell biology and is therefore relevant for normal and dysregulated humoral immunity, such as in autoimmune diseases or plasmacytoma.

Planed tasks for RISE student
The student project will contain analysis of TFG KO cell lines in terms of ER stress, unfolded protein response and autophagy with qRT-PCR, ElliSpot and flow cytometry
or assistant to characterize the conditional KO of TFG *in vivo* murine B cells either with mb1-Cre or CD23-Cre using flow cytometry, ELISA and *in vitro* cultures of isolated B cells.

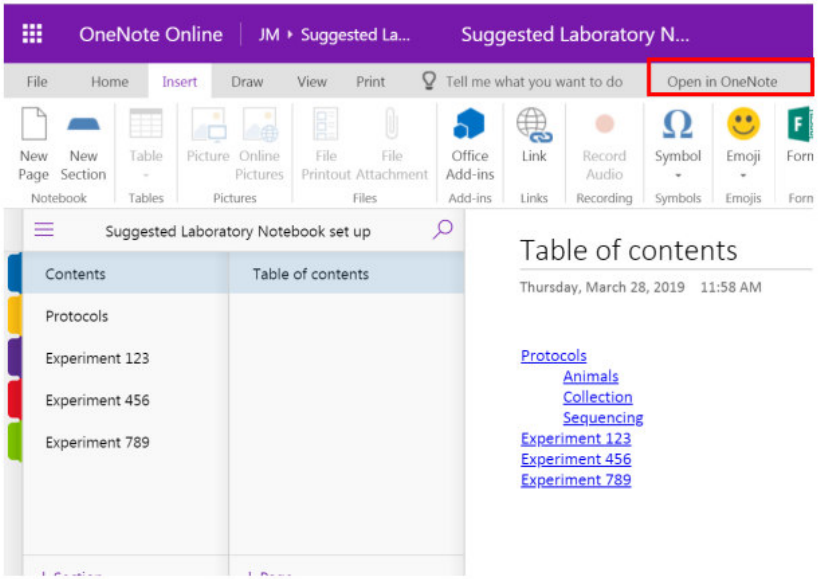
Information about the Division of Molecular Immunology
As a working group of 15-20 members around 4 group leaders under the supervision of Prof. Dr. H.M. Jäck we are interested in B lymphocyte and plasma cell development, function and homeostasis. B lymphocytes are essential for a humoral immune response and the generation of a functional memory. For our investigations we use modern techniques like "Seahorse", single cell analyses of 10x genomics or Crisper/Cas. Standard methods like flow cytometry, western blotting and PCR are common methods in our laboratory.
The research Institute is located in the medium sized town of Erlangen famous for its outstanding university clinic, in the middle of Baveria. Nevertheless the city has a natural, rural charm and despite its size relaxation in the nature is never far away. The whole region of Franconia is famous for varies breweries and Bavarian beer.

Communication & Data Management

- Data documentation
- Data storage
- Communication

Microsoft 365
Business Standard

Opening a OneNote notebook



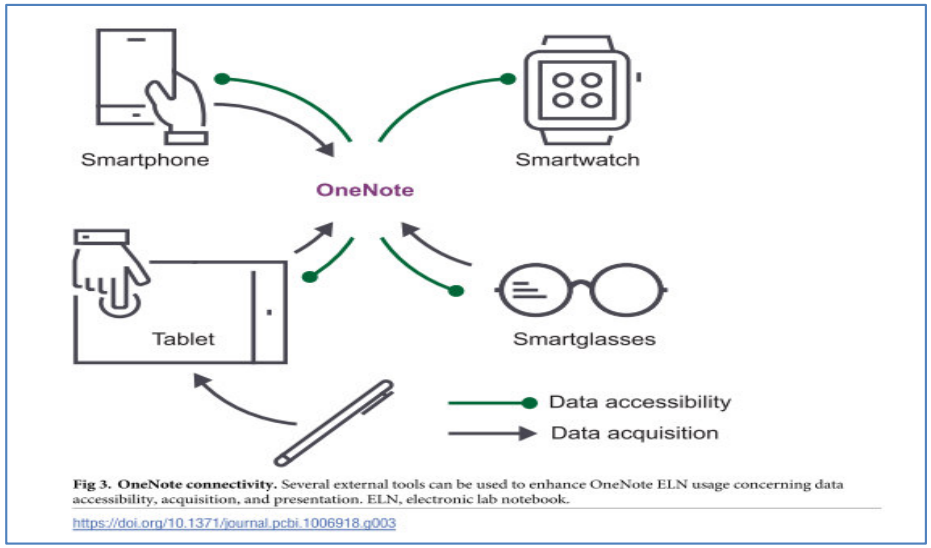


Fig 3. OneNote connectivity. Several external tools can be used to enhance OneNote ELN usage concerning data accessibility, acquisition, and presentation. ELN, electronic lab notebook.

https://doi.org/10.1371/journal.pcbi.1006918.g003

GRK2599 – *Data Management*

ELN

- Lab folder
- SciNote
- Lab Archives
- Labstep
- Benchling
- OpenBis
- ….

- Design experiment
- Material inventory
- Protocols
- Communication

Raw data

- ASCII (flow)
- Tiff (Scans, photos
- Excel (sequences)
- …

Medical Informatics

- *Prof. Prokosch*
- *Dr. Christoph*

FAU Storage

- Name files and assign an UI
- Upload file into
- searchable FAU Cloud

Retrieval of raw data used in publication

Publication

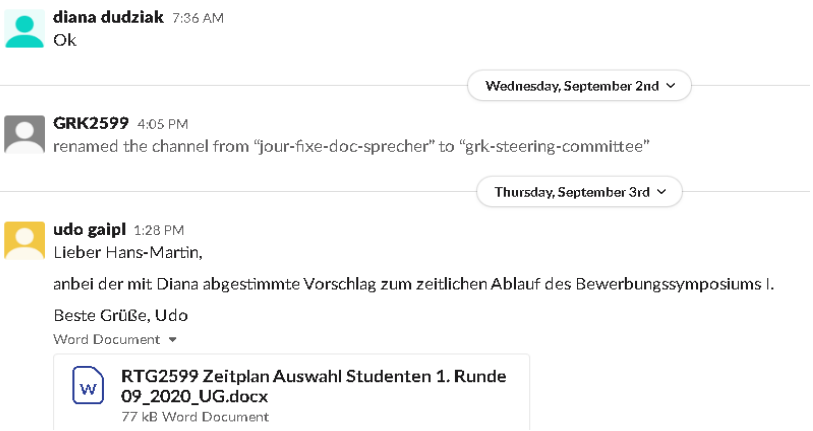
Prepare presentation files

RTG2599 – *Collaboration & Communication*

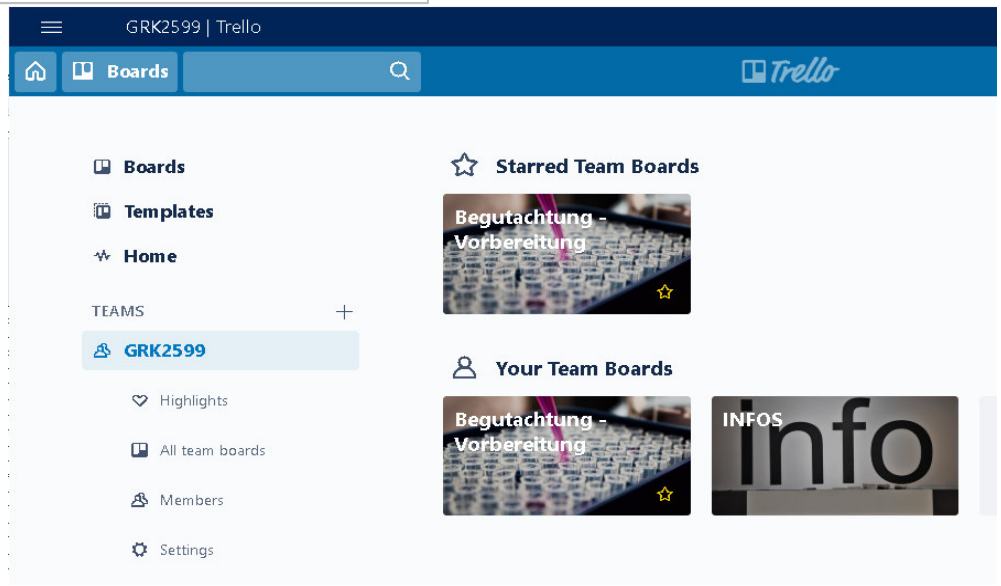
https://www.stackfield.com/de/

https://slack.com

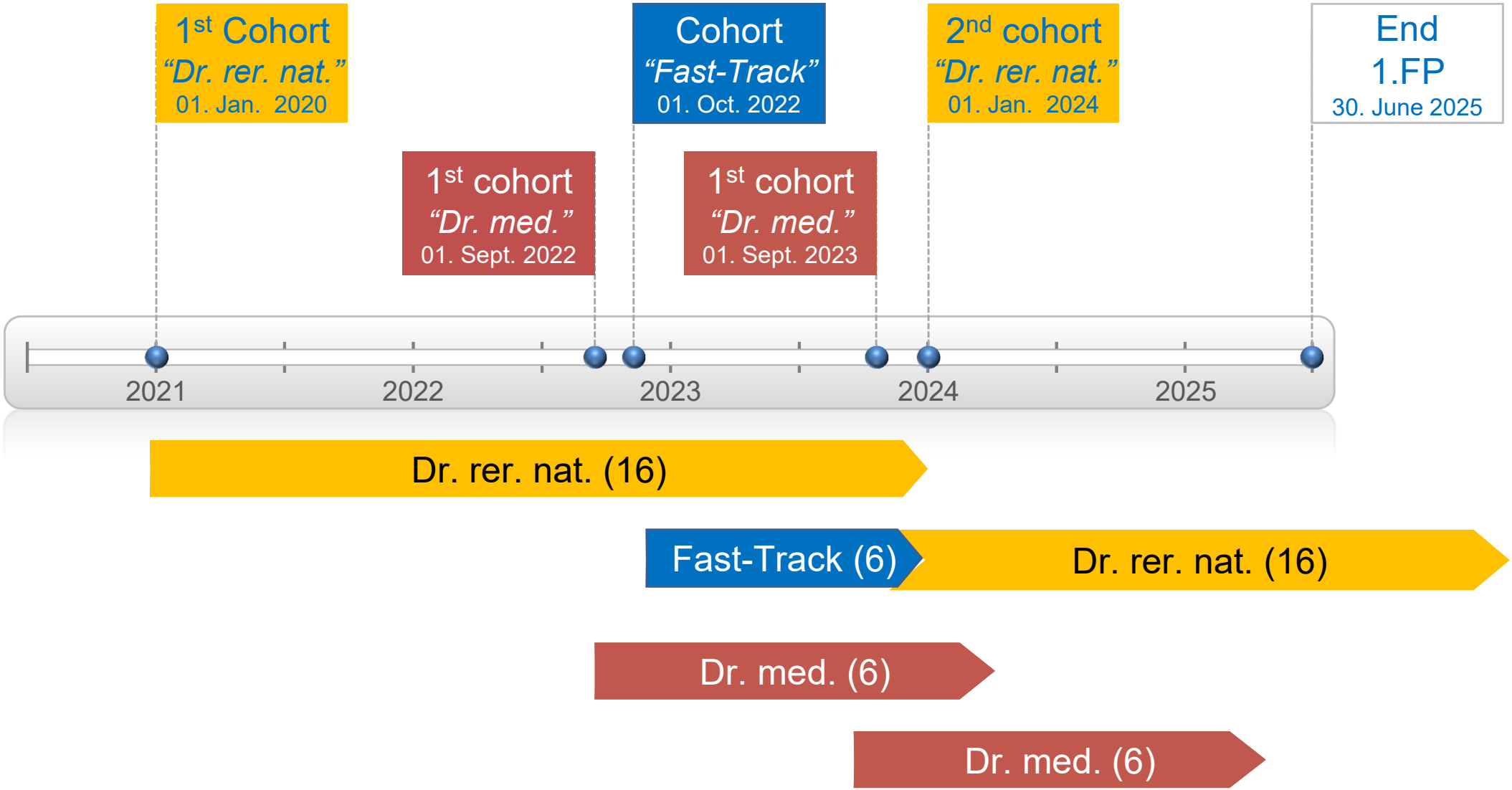
slack



https://trello.com/

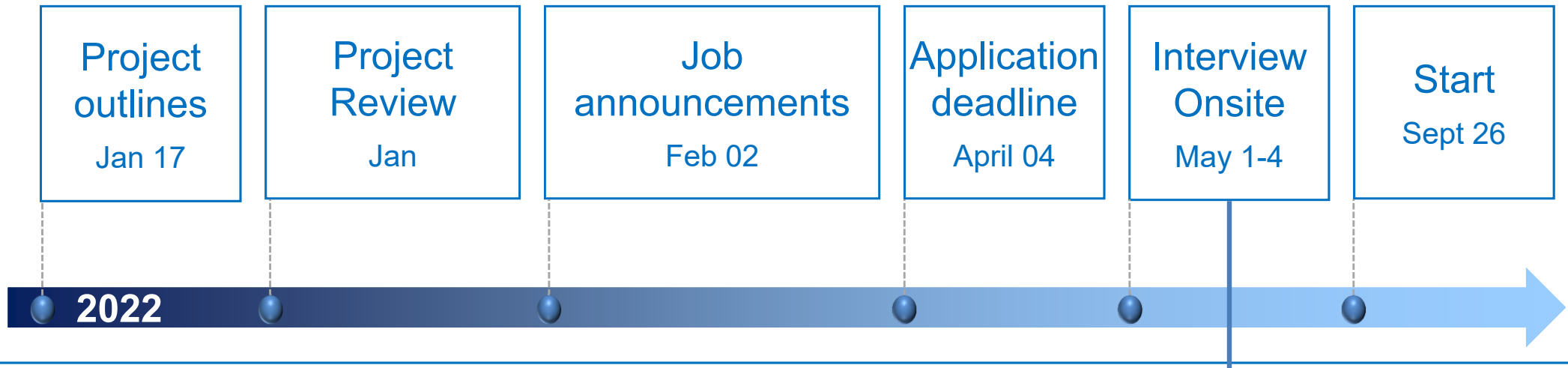


GRK2599 - Doctoral Cohorts



Recruitment – *Schedule (Fast-Track)*

Fast-Track Dr.rer.nat candidates



Presentations
(will be graded !!)

- *Bachelor thesis*
- *Publication*
- *POL*

Meeting with

- *Current doctoral candidates*
- *Selected Pis*
- *GRK steering committee*

Recruitment – *Selection*

Organization Chart - GRK2599

- Paul Ehrlich Club
- Regulars' table
- Guest speaker seminar
- Public outreach
- RTG Symposium 2023

- Admission of all doctoral candidates
- Approval of thesis projects (Dr. med. & 2nd Dr. rer. nat. cohort)
- Budget
- Appointment of exam committees for defense of thesis outlines

Coordination

Coordinator
(A. Giniewski)

GRK Steering Committee

3 Doctoral Representatives

- Speaker
- 2 Co-Speakers
- 3 RTG Researchers

External Advisory Board

N.N.

N.N.

N.N.

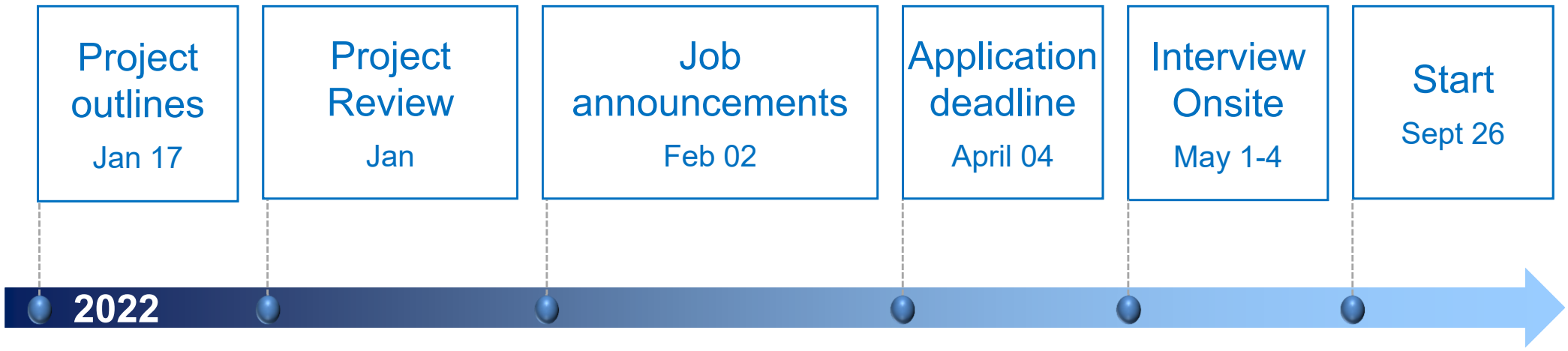
Doctoral candidates

GRK Researchers

GRK2599 General Assemblies

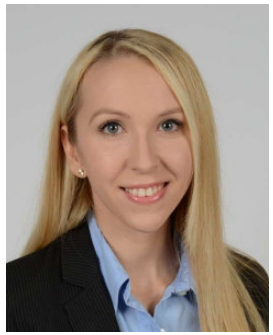
Recruitment – *Schedule (Fast-Track)*

Fast-Track Dr.rer.nat candidates



Dr. Natalie Schröter

Koordinatorin



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