



# Metabolism in a box: A virtual grant challenge

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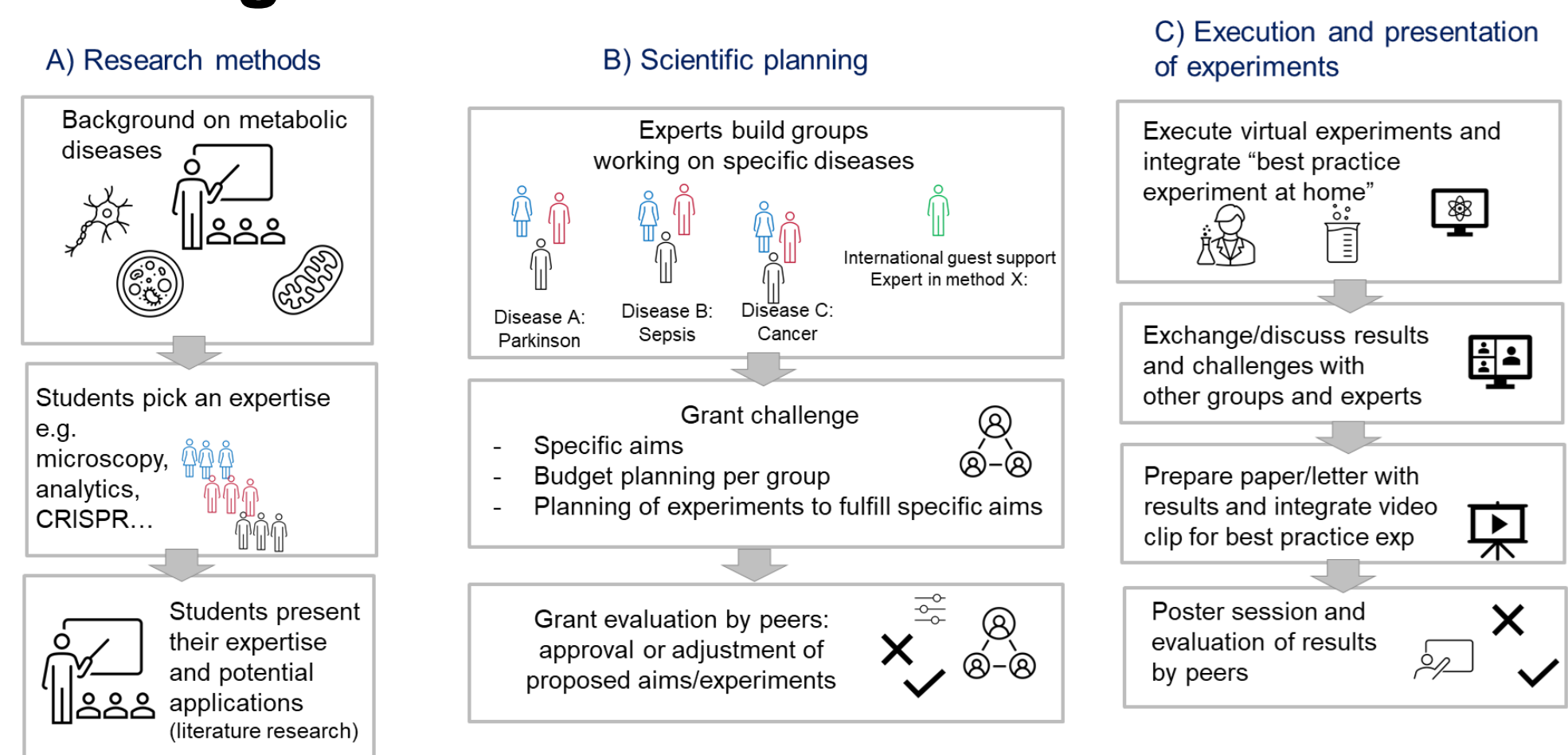


Cellular Metabolism Lab

**Metabolism consists of complex biological processes that influence human health and disease. Due to the international aspect of biological sciences and the complexity of biochemical pathways many students think of metabolism as a black box that is challenging to understand. As such, we have an increasing need for alternative teaching and learning approaches covering digitalization and internationalization which is oftentimes restricted in traditional classroom settings.**

## Metabolism in a box – an interactive grant challenge

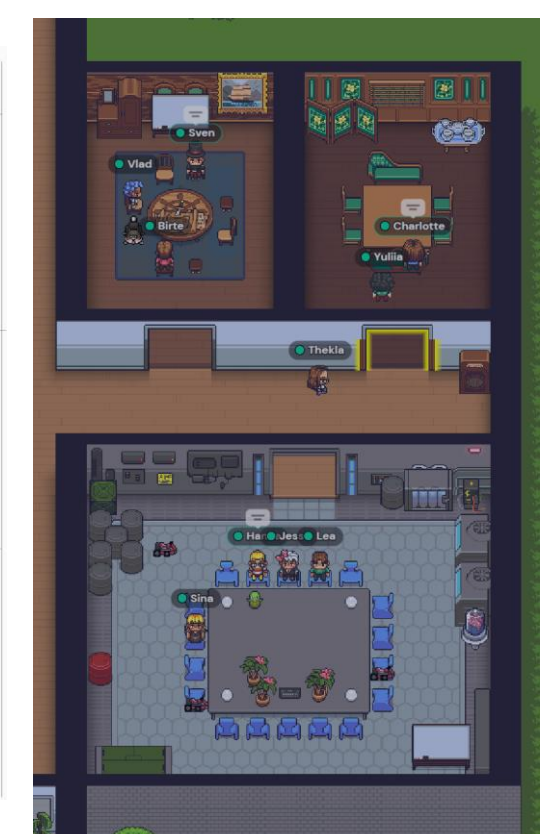
- An interactive „Planspiel“ with metabolic background
- **Flipped classroom model**
- Participants will (self-) learn:
  - Literature research
  - Planning of experiments and present scientific data
  - Writing a grant & budget planning (practical course)
  - Critical review of scientific work of others
- International teaching aspect:
  - „**Ask me anything sessions**“ from international students/industry
  - International guest speaker
  - Digital setting, English module



## Online tools

- StudIP as information and data hub
  - Best practice examples and tutorials are available
  - Courseware to support a structured course of events
- Mural for brainstorming, mind maps and discussions
- Gather.town as fun, interactive and versatile conference call room
  - Meeting with all students
  - Easy accessible breakout-rooms for group work
- Software: Biorender, ChatGPT, grammarly and many more

WKS - Expert Profile	Expert: Microscopy	Expert: Mass spectrometry	Expert: In silico models
Disease Group: SLC6A/CAR	Expertise: Microscopy	Expertise: Mass spectrometry	Expertise: In silico models
Disease Group: Neurodegeneration	Expertise: Microscopy	Expertise: Mass spectrometry	Expertise: In silico models
Disease Group: 24h/24h	Expertise: Microscopy	Expertise: Mass spectrometry	Expertise: In silico models



## Evaluation

- Feedback meeting with participating students
- Evaluation by the Projekthaus and ProDiGi questions
- Feedback in Portfolio

## Students feedback

1. What did you learn in this 2<sup>nd</sup> part of the course that you did not expect to learn (was of a surprise to you)?

Regarding the practical where we had to create results for the aims we proposed in our grant application I was pleasantly surprised that I was "forced" to improve/use my ability to think critically about results before getting them. Although it is probably advised to always do this when performing experiments, not even having the opportunity to check my assumptions required me to at least try to really understand the already known information to then make an educated assumption about the outcome of my experiments. This

4. Something that you enjoyed the most in this class:

The organization and atmosphere were very nice, I felt comfortable all the time. I also liked a lot that MetaBox is an interactive module with different smaller tasks and no big exam at the end. Thekla was always positive and motivated us constantly. Gathertown was fun, it is much better than Webex or Big Blue Button.

I like Thekla's enthusiasm. It makes you feel more comfortable expressing ideas and thoughts even if you are not sure if it makes sense.

I enjoyed working in a group and working alone was that balanced. We always had contacts in the disease group as well as in the methodology group to exchange ideas. It was also good to share personal feedback in smaller groups and only the ones for the whole group in the entire class. Additionally, I enjoyed that we could meet at Gathertown any time to meet up with individuals or in a group.

*P.S.: To sum up, MetaBox is a highly interactive, multifaceted and innovative course! I enjoyed it a lot, as it challenged me to think of questions that did not occur to me before. Many thanks for this!*

3. What did you learn in this course that you did not expect to learn (was of a surprise to you)?

As I didn't know the schedule and what to expect, almost everything was a positive surprise. I found it fantastic that we as a course got to create a grant proposal as I doubt you learn it elsewhere during university courses. The whole approach was very well thought-out and prepared by Thekla as it was very easy going and pleasant with the time and tasks we were given each week.

As well as the many short presentations we had to prepare. Normally we have to present a topic for 15 to 20 minutes which is very different.

I didn't expect that metabolism can be so exciting. I only know basic metabolic pathways. I never thought about diseases and their link to altered metabolism in detail. I learned it is very useful to work together with different experts to combine experiments with different methods. Teamwork and collaborations are important to reach the goals of the research. The online tool Gathertown makes it easy to stay connected when we are working in groups or on our own at home, I didn't expect that it would work so well.

I was also really impressed by the well working online setting which I mainly attribute to the very small (sub-)groups and also the environment of gathertown that gives "power" to the students in the sense that they can move freely into smaller meetings and makes the online setting feel a bit more real.

I have to say, that for one the structure of this class and the distribution of tasks/work was well planned and helped carry out the tasks in a very productive way.

The way this course was planned and executed was new to me and I enjoyed the flexibility given by gathertown.

I'm also pleased to have been able to learn details about diseases and metabolites I haven't worked with before and expand my knowledge of different methods.

## Future

Implementation into the BPO of MSc. Biology /Biotechnology, fixed part of curriculum WiSe23/24  
Concept transferable to other scientific fields (base module is the same – other focus e.g.)

Modulverantwortung: SB Wahlpflicht und IB Wahlpflicht: Metabolism in a box: A virtual grant challenge	Modulnummer:
Institution: Studienkennzahl Biologie	Modulabkürzung:
Werkstoff: 300 h	Pharmazie: 180 h
Leistungsform: 10	Semester: Anzahl Semester: 1
Wahlweise: Wahlweise	DWS: 10
Lernveranstaltungsgegenstände: Vorlesung Metabolism in a box: A virtual grant challenge (Bio-Bio-Bio) (V) Praktikum Metabolism in a box: A virtual grant challenge (Bio-Bio-Bio) (P) Übung Metabolism in a box: A virtual grant challenge (Bio-Bio-Bio) (Ü)	
Belegungsgültigkeit (wenn alternative Auswahl, etc.):	
Literatur: Prof. Thekla Cordes	
Qualifikationsziele: After completing the module, students are able to: - understand how metabolism influence cellular mechanisms and how metabolic vulnerabilities can be exploited to buffer human disease outcome - identify and apply techniques to analyze human metabolism - explain how metabolic techniques can be applied in the context of different disease settings - develop strategies on how analyzing metabolism may be applied in the context of various metabolic diseases - write, present, and discuss scientific work - evaluate and interpret scientific literature and proposals - provide critical feedback on scientific work - Work on a research project as a team in a "real" scientific environment	

## Challenges/Lessons learned

- Teaching concept works only if all students participate as we integrated feedback and group sessions
- Students appreciate novel teaching concepts

