PhD course on best practice in preclinical animal research models to improve translation from bench to bedside.

Charité – Universitätsmedizin Berlin, Germany

June 17th – June 19th, 2019

Background

In the scientific community, there is an increasing awareness of the limitations and difficulties in translation of preclinical studies to clinical results. Even though the origins of these difficulties are multi-causal, there is a consensus for a reevaluation of preclinical research strategies. Meta analytic approaches have described a lack of methodological rigor in execution and reporting of experimental findings that persists even when guidelines like ARRIVE (Animal Research: Reporting of *In Vivo* Experiments) give clear guidance on these issues. Examples are flawed study designs with lack of appropriate controls, non-blinded investigators, and low statistical power. That is, it is equally important to choose the correct preclinical model and to study the model in an unbiased way. Implementing these guidelines and associated techniques in laboratories requires education with the express purpose of saving money and lives and the motivation to establishing a firm connection between preclinical researchers and the reality of the diseases they study, i.e. the patients.

This PhD course will address best practices and pitfalls in preclinical animal research. The course is a joint project between Charité – Universitätsmedizin Berlin, QUEST Center at the Berlin Institute of Health (BIH), and Charité 3R.

Course content will cover but is not limited to:

- Experimental standards and reproducibility
- Preclinical guidelines (ARRIVE)
- Preregistration of preclinical studies/Registered Reports
- Study designs
    - Randomization, blinding, appropriate controls
- Age, Gender, co-morbidities and medication
- Statistics and preclinical studies (effect size, sources of variation, value of p-value
- 3R in animal research

Keynote lecture by Professor Hanno Würbel, Bern

Costs

The course itself is free, but participants have to arrange for their accommodation and travel themselves. Costs for this are not covered.

Registration

Registration is now closed. If you want to be on a waiting list please write an email to: ulf.toelch@bihealth.de.

Suggested Textbook

Festing, M. (Ed.). (2016). *The Design of Animal Experiments: Reducing the use of animals in research through better experimental design* (2 edition). Los Angeles London New Delhi: SAGE Publications Ltd.

Read Chapters: 1-3 and 12,13

Suggested Additional Reading List

Baker, D., Lidster, K., Sottomayor, A., & Amor, S. (2014). Two Years Later: Journals Are Not Yet Enforcing the ARRIVE Guidelines on Reporting Standards for Pre-Clinical Animal Studies. *PLOS Biology*, *12*(1), e1001756. https://doi.org/10.1371/journal.pbio.1001756

Ioannidis, J. P. A., Greenland, S., Hlatky, M. A., Khoury, M. J., Macleod, M. R., Moher, D., … Tibshirani, R. (2014). Increasing value and reducing waste in research design, conduct, and analysis. *Lancet (London, England)*, *383*(9912), 166–175. https://doi.org/10.1016/S0140-6736(13)62227-8

Kaur, A., Aho, E., Westermarck, J., Knuuttila, M., Poutanen, M., Jumppanen, M., … Fey, V. (2016). Optimized design and analysis of preclinical intervention studies *in vivo*. *Scientific Reports*, *6*, 30723. https://doi.org/10.1038/srep30723

McGrath, J., Drummond, G., McLachlan, E., Kilkenny, C., & Wainwright, C. (2010). Guidelines for reporting experiments involving animals: the ARRIVE guidelines. *British Journal of Pharmacology*, *160*(7), 1573–1576. https://doi.org/10.1111/j.1476-5381.2010.00873.x

Moher, D., Avey, M., Antes, G., & Altman, D. G. (2015). The National Institutes of Health and guidance for reporting preclinical research. *BMC Medicine*, *13*, 34. https://doi.org/10.1186/s12916-015-0284-9

June 17th - BIH, Anna-Louisa-Karsch-Straße 2, 5th floor

Time	Topic	Possible Lecturers
9:00-9:45	Introductory Round and Registration	All
9:45-11:15	Epidemiology of Preclinical research	Bob Siegerink
11:15-11:30	Break	
11:30-12:30	Experimental Design I	Ulf Toelch
12:30-13:30	Lunch	
13:30-14:15	Experimental Design II	Meggie Danziger
14:15-14:30	Break	
14:30-15:30	Experimental Design Assistant	Ulf Toelch
15:30-18:00	Read and discuss 1 paper on animal experiments in groups of 4. Discuss the design. Make a sketch of each design.	Students and faculty
19:00-20:00	Keynote	Hanno Würbel

June 18th - BIH, Anna-Louisa-Karsch-Straße 2, 5th floor

Time	Topic	Lecturer
9:00-10:00	Ethics: Reduce Waste Increase Value	Daniel Strech
10:00-11:00	Quality Management in Preclinical Research	Rene Bernard
11:15-12:00	Visualisation in preclinical research with emphasis on small sample sizes	Tracey Weissgerber
12:00-13:00	*Lunch*	
13:00-14:00	The p-value in experimental animal research	Ulrich Dirnagl
14:30-15:30	Statistics in preclinical research with emphasis on small sample sizes	Frank Konietschke
15:30-18:00	Check paper for reporting and identify shortcomings, discuss improvements. Prepare short (~ 10 Minutes) presentations on one paper for next morning	Students and faculty

June 19th - Charité Campus Virchow Klinikum, Augustenburger Platz 1 (CVK, Forum 3, Kursraum 3)

Time	Topic	Lecturer
09:00-09:45	Introduction into the 3R principle	Gilbert Schönfelder
09:45-10:30	Reporting in vivo experiments	Gilbert Schönfelder
10:30-10:45	*Break*	
10:45-11:30	3R examples at Charité: iPS derived organoids - chances and limitations	Andreas Kurtz
11:30-12:15	3R examples at Charité: Technical possibilities contributing to animal welfare	Juliane Unger
12:15-13:15	*Lunch*	
13:15-16:15	Student Presentation and final discussion	All