Master study „Molecular Cell and Developmental Biology“
Application Form for the optional module
„Lab Rotations – Project study“

Time period of project study: (Min. 8 weeks) Application prior to start of project study is obligatory	From		To
Applicant			
Surname		First name	
Matr.Nr.		Study ID. No.	
Supervisor/Lecturer			
Name:			
Eligible are:	**Supervisor**	**Dept./group**	**Institution**
IBA			LFU
Molbio			LFU
Zoology			LFU
MUI			MUI
External			
Scientific field			
Developmental biology ☐	Cell biology ☐		Biomedical Aging Research ☐

Signatures:

Applicant, Date ……………………………….................................

Supervisor, Date ……………………………………………………….

Please attach:
One Paragraph about:
What is the scientific question, how will it be adressed, why is this relevant ?

Formal criteria:
-The application must be submitted prior to the study
-The duration of the study must be at least 8 weeks (15 ECTS = 375 hours !)
-The application should be written in English.
-Only **one study per department** is allowed

The application should have a **headline** and three equivalent **paragraphs** addressing the following questions (similar to the Nature Abstracts – see below):

1. Part: What is the scientific topic and which specific scientific question will be addressed in this context?

2. Part: How will this question be addressed methodically (a list of methods is not acceptable, rather explain why specific techniques will be used)?

3. Part: What are the expected results and what is the relevance of these results for the supervising group and/or the scientific field?

Cf. Example from Nature below)

nature

How to construct a *Nature* summary paragraph

Annotated example taken from *Nature* **435**, 114-118 (5 May 2005)

*One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.*

*Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines.*

*One sentence clearly stating the **general problem** being addressed by this particular study.*

*One sentence summarising the main result (with the words "**here we show**" or their equivalent).*

*Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge.*

*One or two sentences to put the results into a more **general context**.*

*Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline, may be included in the first paragraph if the editor considers that the accessibility of the paper is significantly enhanced by their inclusion. Under these circumstances, the length of the paragraph can be up to 300 words. (The above example is 190 words without the final section, and 250 words with it)*

During cell division, mitotic spindles are assembled by microtubule-based motor proteins[1,2]. The bipolar organization of spindles is essential for proper segregation of chromosomes, and requires plus-end-directed homotetrameric motor proteins of the widely conserved kinesin-5 (BimC) family[3]. Hypotheses for bipolar spindle formation include the 'push–pull mitotic muscle' model, in which kinesin-5 and opposing motor proteins act between overlapping microtubules[2,4,5]. However, the precise roles of kinesin-5 during this process are unknown. Here we show that the vertebrate kinesin-5 Eg5 drives the sliding of microtubules depending on their relative orientation. We found in controlled *in vitro* assays that Eg5 has the remarkable capability of simultaneously moving at ~20 nm s^{-1} towards the plus-ends of each of the two microtubules it crosslinks. For anti-parallel microtubules, this results in relative sliding at ~40 nm s^{-1}, comparable to spindle pole separation rates *in vivo*[6]. Furthermore, we found that Eg5 can tether microtubule plus-ends, suggesting an additional microtubule-binding mode for Eg5. Our results demonstrate how members of the kinesin-5 family are likely to function in mitosis, pushing apart interpolar microtubules as well as recruiting microtubules into bundles that are subsequently polarized by relative sliding. We anticipate our assay to be a starting point for more sophisticated *in vitro* models of mitotic spindles. For example, the individual and combined action of multiple mitotic motors could be tested, including minus-end-directed motors opposing Eg5 motility. Furthermore, Eg5 inhibition is a major target of anti-cancer drug development, and a well-defined and quantitative assay for motor function will be relevant for such developments.