



## Interactive Tasks Cell Biology for Chemical Biologists

### Practical Tasks

This task refers to the interactive tutorials provided on the website. The solutions are compiled in a pdf and sent by e-mail to peter.nick@kit.edu

Evaluation: each task can earn 1 P, in total 5 P

#### Task 1: Tutorial Absorptionsfilter

You have a double stained sample, where plant microtubules have been labelled by IF together with a HSP90 (you want to see, whether HSP90 is a MAP, and, therefore, really decorates microtubules). You have got an anti- $\alpha$ -tubulin primary antibody from mouse, read out by an anti-mouse IgG conjugated to FITC, you have got an anti-HSP90 primary antibody from rabbit, read out by an anti-rabbit IgG conjugated to Texas Red. In the tutorial, you can change the settings for the absorption filter. Find the right setting to see microtubules, and the right setting to see HSP90. Each time, you do a screenshot of the settings – please do not forget to tell, which one is for which purpose.

#### Task 2: Tutorial Konfokale Lochblende

Work with the pumpkin stem and collect a confocal z-stack from the xylem vessel. Try to sketch down a three-dimensional model of this vessel (just a piece of paper, send in the image).

#### Task 3: Tutorial Chromophorbildung

The fluorescence is based on an extensive conjugated double-bond system, constructed from Thr<sub>65</sub>-Tyr<sub>66</sub>-Gly<sub>67</sub>. Sketch down the first and the last image of the interactive sequence and sketch into the structure, where there are double bonds.

#### Task 4: Tutorial Zellkulturmikroskop

You are looking at HeLa cells transfected with GFP-tubulin, which you also have stained for DNA using DAPI. You first want to find the right focal plane looking through the eye piece and adjusting the focus using the nuclear signal as readout (setting 1). After that you want to record a beautiful image of the GFP-tagged microtubules (setting 2). Adjust the conditions for these two settings and do a screenshot, respectively.

**Task 5: Tutorial aufrechtes Mikroskop**

You are investigating the stomata from a tulip leaf, this time through an upright microscope. You have the following sequence. Find the focal plane controlling visually (setting 1), then you want to record the brightfield image of the stomata photographically (setting 2), then you want to see, whether the guard cells, in contrast to the neighbouring cells, contain functional chloroplasts, making use of the chlorophyll autofluorescence (setting 3, for the sake of simplicity, we assume that the right filter set is already in place).