Biological characterisation of biomaterials

Course information

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Number of credits: 5 ECTS (hp)

Course period: Autumn 2018 (October – December 2018)

Registration: no later than September 15th

Language of instruction: English

Main fields of study: biomaterials, materials science, biology, medicine

Target group: PhD students performing research on biomaterials, involving departments such as Engineering Sciences, Chemistry, Biology, Pharmacy and Medicine.

Maximum number of participants: 25

Requirements: Registered in a third cycle program

Grading system: pass or fail. Attendance to 80% of lecture is required. The examination is divided in three parts: 40% weekly assignments + 30% individual project + 30% active participation in seminars and activities.

Course structure: The course consists of 10 two-hour (45min x 2) sessions based on the biological characterisation of biomaterials, both in vitro and in vivo. In general, each two-hour session is divided in 45 min lecture + 45 min interactive activities (seminar/discussion/work in groups).

Aim and scope: This course aims to give a deeper knowledge about how biomaterials are commonly tested in vitro (cell cultures) as well as in vivo (animal models).

The content of the course is the following:

1) Basics about cells and biomaterials
2) Protein-biomaterial interactions
3) Blood-biomaterial interactions
4) 2D and 3D models to characterize biomaterials in vitro
5) Microfluidic systems to characterize biomaterials in vitro
6) Evaluation of biocompatibility
7) Animal testing
8) Legislation and ethics
9) Ethical applications
10) Planning research towards commercialization
### Preliminary schedule

Rooms located at Ångström laboratory; Tuesday and/or Thursday 13-15h (October – December 2018)

<table>
<thead>
<tr>
<th>Session # /date (room)</th>
<th>Content of each lecture</th>
<th>Teacher</th>
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| 1 (week 40) 2/10 (Beurlingsrummet) | 1) Course information & Presentation from teachers  
2) Presentation of students’ research projects | GM, NF, GHB |
| 2 (week 40) 4/10 (Beurlingsrummet) | 1) Planning research towards commercialization  
2) Basics about cells and biomaterials | 1) PP  
2) GM |
| 3 (week 41) 11/10 (Beurlingsrummet) | Protein-biomaterial interactions | KF |
| 4 (week 42) 18/10 (Beurlingsrummet) | Blood-biomaterial interactions | NF |
| 5 (week 43) 25/10 (Fakultetsrummet) | 2D and 3D models to characterize biomaterials in vitro | GM |
| (week 44) Höstlov (no lectures) | | |
| 6 (week 45) 6/11 (Beurlingsrummet) | 1) Microfluidic systems to characterize biomaterials in vitro  
2) Single cell analysis using droplets | 1) GM  
2) MT |
| 7 (week 45) 8/11 (Beurlingsrummet) | 1) Biocompatibility evaluation (application oriented)  
2) Introduction to the project | NF |
| 8 (week 46) 15/11 (Fakultetsrummet) | Animal testing | GHB |
| 9 (week 47) 22/11 (Beurlingsrummet) | 1) Legislation and ethics  
2) Ethical applications | GBH |
| 10 (week 48) 27/11 (Beurlingsrummet) | 1) Discussion on ethical applications  
2) Questions about projects (voluntary part) | 1) GHB  
2) GM, NF, GHB |
| 11 (week 48) 29/11 (Beurlingsrummet) | Gap between research world and commercialization. Case studies | PP, GHB |
| 12 (week 49) 6/12 (Beurlingsrummet) | Presentation projects | GM, NF, GHB |

*GM: Gemma Mestres; GHB: Gry Hulsart-Billström; NF: Natalia Ferraz; MT: Maria Tenje; PP: Philip Procter; KF: Karin Fromell  
*Project-related session marked in blue*