Subject Area: Advanced Methods in Biotechnology and Biodiversity
Subject: Plant morphogenesis in vivo and in vitro
Level: PhD
Year: I-IV
Status: Facultative
ECTS: 3

Department: Genetics
Cooperating Department: Cell Biology

Form of teaching (Number of hours; Form of assessment: Exam or Credit)

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Seminars/Conversatoria</th>
<th>Practicals</th>
<th>Total</th>
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<tr>
<td>4</td>
<td>0</td>
<td>26</td>
<td>30</td>
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Staff:
SUBJECT COORDINATOR: Prof. Małgorzata D. Gaj PhD
LECTURE: Prof. Małgorzata D. Gaj PhD, Prof. Ewa Kurczyńska PhD

Contents: LECTURES:

Genetic determination of plant morphogenesis in vitro

*Arabidopsis* as a model in studies on plant morphogenesis *in vivo* and *in vitro*. *In vitro* culture systems used to identified genes involved in plant regeneration. Somatic embryogenesis as a model for understanding genetic determination of zygotic embryogenesis. Advances in the identification of specific genes that are involved in organogenesis and somatic embryogenesis *in vitro* and selected technical tools applied.


Symplasmic communication and plant development


PRACTICALS: The practicals include the following techniques:

- RNA extraction from different stages of embryogenic *Arabidopsis* culture (control versus mutant impaired in somatic embryogenesis). Reverse transcription
- Analysis of expression of selected genes related to somatic embryogenesis process with use of Quantitative Real-Time PCR (qRT-PCR)
- Karyotype analysis of callus derived form polysomatic and nonpolysomatic plant.
- Analysis of developmental changes of polysomy pattern using flow cytometry.
- Comparative analysis of endopolyploidy patterns in various plant organs and tissues using imaging cytometry.
- Analysis of symplasmic transport fluorochromes (low-molecular weight and with dextrans) distribution in explants during different stages of development and somatic embryos with the use of fluorescence microscopy and confocal microscopy (CLSM)
- Determination of the symplasmic domains and subdomains in relation to cell and tissue differentiation

Methods and forms of teaching: Lectures illustrated by computer presentations and video projector.

Requirements: Knowledge of genetics, cytogenetics, cell biology and molecular biology at the basic level.

Literature (maximum 5 sources, all in English):

5. van BEL, van Kesteren "Plasmodesmata. Structure, function, role in cell communication:, Springer, 1999

Remarks (if necessary):