

## AvH International Course “Nuclear Architecture, Chromosome Territories, Chromatin Dynamics and Genetic Damage“

April 4-13, 2011

### Programme

#### Monday, April 4

##### **Lectures (9.30 – 12.30)**

*Thomas Cremer*

Introduction. Towards an understanding of the functional integration of genetics, epigenetics and nuclear architecture.

*Marion Cremer*

Linking the linear DNA sequence organization of metaphase chromosomes with their 3D arrangement in interphase nuclei. Introduction in the basic principles of FISH techniques.

##### **Laboratory demonstration (14.00 -17.30)**

DNA probe generation by (DOP-) PCR or isothermal, multiple displacement amplification (MDA) reaction, probe labeling by Nick translation and setup of hybridization solution, pretreatment of cultivated cells for 3D-(immuno) FISH.

##### **Seminar (17.30-18.30)**

#### Tuesday, April 5

##### **Lectures (9.30 - 12.30)**

*Marion Cremer*

Strategies for the generation of DNA probes.

*Jens Nagel*

Strategies for efficient labelling of DNA probes.

*Thomas Cremer*

Chromosome conformation capture techniques – a biochemical approach to study nuclear architecture.

##### **Laboratory demonstration (14.00 – 17.30)**

##### **Seminar (17.30-18.30)**

Setup of hybridization; replication labeling by scratch labeling of fluorochrome-labeled dUTPs.

## Wednesday, April 6

### **Lectures (9.30 – 12.30)**

*Thomas Cremer*

Lamins and their function of chromatin organization.

*Thomas Cremer*

Chromatin dynamics during terminal differentiation.

### **Laboratory demonstration (14.00 – 17.30)**

Monitoring of scratch labeled cells and identification of different cell cycle stages (in combination with immunodetection of cell cycle associated markers). Detection of FISH.

### **Seminar (17.30-18.30)**

## Thursday, April 7

### **Lectures (9.30 – 12.30)**

*Jens Nagel*

Identification of different cell cycle stages by appropriate markers.

*Thomas Cremer*

Chromatin dynamics during the cell cycle.

*Thomas Cremer*

Chromosome territories and the interchromatin compartment: a functional marriage.  
New insights by high resolution microscopy.

### **Laboratory demonstration (14.00 – 17.30)**

Further monitoring of scratch labeled cells after several cell divisions. Evaluation of FISH slides by confocal microscopy.

### **Seminar (17.30-18.30)**

## Friday, April 8

### **Lectures (9.30 – 12.30)**

*Gustavo Folle*

Nuclear architecture and genetic damage.

*Gustavo Folle*

Euchromatin, heterochromatin and genetic damage.

### **Laboratory demonstration (14.00 – 17.00)**

Quantitation of DNA double strand break formation through immunodetection of gamma-H2AX foci in nuclei and metaphase chromosomes.

***Invited Lecturer (17.30 – 18.00)****Máximo Drets*

Structure and function of the subtelomeric/telomeric regions: Implications in human congenital syndromes

**Saturday, April 9*****Minipresentations (9.00 – 11.30)***

Short presentation of research topics by Course local and regional participants.

***Seminar (11.30-12.30)*****Monday, April 11*****Lectures (9.30 – 12.30)****Ricardo Benavente*

Nuclear envelope, lamins and eukaryotic cell compartmentalization.

*Ricardo Benavente*

Molecular architecture and functions of the nuclear envelope.

***Laboratory demonstration (14.00 – 17.30)***

Dynamics of nuclear envelope (NE) components I. Immunostaining of NE components in cell cultures to ascertain their mitotic redistribution and contribution to nuclear reassembly.

***Seminar (17.30-18.30)*****Tuesday, April 12*****Lectures (9.30 – 12.30)****Ricardo Benavente*

Nuclear envelope and the cell cycle.

*Ricardo Benavente*

Nuclear envelope and cell differentiation.

***Laboratory demonstration (14.00 – 17.30)***

Dynamics of nuclear envelope (NE) components II. Confocal microscope analysis and discussion of results.

***Invited Lecturer (17.30-18.30)****Juan Benech*

Isolated nuclei as a model to study nuclear signaling

**Wednesday, April 13**

***Lectures (9.30 – 12.30)***

*Ricardo Benavente*

Nuclear envelope and human pathology I.

*Ricardo Benavente*

Nuclear envelope and human pathology II.

***Laboratory demonstration (14.00 – 17.30)***

Viewing isolated nuclei with the Atomic Force Microscope

***Evaluation of Course Faculty (17.30-18.30)***