



Medical University of Graz

# BASIC MOLECULAR BIOLOGY FOR PATHOLOGISTS

GRAZ, MARCH 31 – APRIL 4, 2014



ESCAP – European School of Pathology  
*Molecular Pathology Courses*



## LOCATION:

Center of Medical Research - Medical University of Graz  
Stiftingtalstrasse 24, 8010 Graz, Austria

## COURSE OBJECTIVES:

This course offers a comprehensive series of lectures on the current concepts in diagnostic molecular pathology.

Starting from basics in molecular biology relevant for molecular pathology diagnostics, optimal tissue handling for DNA/RNA and protein extraction as well as biobanking will be covered. This will be followed by techniques for the extraction of biomolecules including circulating tumor cells and circulating tumor DNA. Techniques for mutation analysis and quantification of RNA/DNA as well as protein will be presented.

Finally, diagnostic molecular pathology tests relevant for the analysis of specific tumor types including colorectal, breast, lung, urogenital, soft tissue and skin as well as hematological neoplasia will be presented and include hereditary forms of cancer.

## SCIENTIFIC COMMITTEE:

**Giorgio Stanta**, Molecular Histopathology Laboratory, Department of Medical Sciences, University of Trieste, Italy

**Ernst Jan-M. Speel**, Laboratory for Molecular Oncopathology & Diagnostics, Department of Pathology, Maastricht University Medical Center, The Netherlands

**Gerald Hoefler**, Institute of Pathology, Medical University of Graz, Austria

## CONTACT / REGISTRATION:

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## COURSE FEE: € 500,00

Covered are coffee & lunch breaks on each course day, course materials & the course certificate as well as a guided city walk.

**Pay attention that attendance is limited!** Seats must be confirmed.

## PAYMENT:

A written confirmation including terms of payment, bank account details and information about accommodation will be sent to all registrants. All registrations are pre-registrations until payment is received on the course account.

## MONDAY, MARCH 31, 2014

**08.00 – 08.15** REGISTRATION

**08.15 – 08.30** WELCOME AND INTRODUCTION TO THE COURSE

08.30 – 09.15 DIAGNOSTIC MOLECULAR PATHOLOGY - AN OVERVIEW AND AN OUTLOOK

### STRUCTURE AND FUNCTION OF THE HUMAN GENOME

09.15 – 09.45 Structure and organization of the genome

DNA replication and translation

09.45 – 10.15 Regulations of genome function: transcription regulation and miRNA

Translation and pre/post-translational modifications

10.15 – 10.30 Discussion

**10.30 – 11.00** Coffee

### MAINTENANCE OF GENOME STRUCTURE

11.00 – 11.45 Genome damage and repair mechanisms that stabilize the genome

11.45 – 12.30 Telomerase and regulation of life span

12.30 – 13.00 Discussion

**13.00 – 14.00** Lunch

### EPIGENETIC REGULATION OF GENE FUNCTION

14.00 – 14.45 Promoter methylation

14.45 – 15.30 Histones and chromatin structure

15.30 – 16.00 Discussion

**16.00 – 16.30** Coffee

16.30 – 17.30 Pre-Analytics & Biobanking

17.30 – 18.15 DNA & RNA isolation

18.15 – 18.30 Discussion

## TUESDAY, APRIL 1, 2014

### AN INTRODUCTION TO GENOME AND GENE ABNORMALITIES AND THEIR RELATION TO DISEASE

08.30 – 09.15 Germ line aberrations: hereditary diseases

09.15 – 10.00 Somatic aberrations: acquired anomalies

10.00 – 10.30 Discussion

**10.30 – 11.00** Coffee

### HOW DO WE STUDY GENES:

#### THE TOOLBOX OF THE MOLECULAR BIOLOGIST I

11.00 – 11.45 Principles of PCR: end-point, real time, digital, quantitative, mutation detection

11.45 – 12.30 NGS comparison with Sanger and pyrosequencing

12.30 – 13.00 Discussion

**13.00 – 14.00** Lunch

## TUESDAY, APRIL 1, 2014

### HOW DO WE STUDY GENES:

#### THE TOOLBOX OF THE MOLECULAR BIOLOGIST II

14.00 – 14.45 Cell and tissue based techniques: ISH, FISH, CISH

14.45 – 15.30 Gene expression: mRNA and miRNA

15.30 – 16.00 Discussion

**16.00 – 16.30 Coffee**

#### THE MOLECULAR PATHOLOGY LAB

16.30 – 17.30 How to set up a molecular pathology lab

Quality control in molecular pathology lab

17.30 – 18.30 Discussion & Lab visit

## WEDNESDAY, APRIL 2, 2014

### MOLECULAR PATHOLOGY OF CANCER:

#### TRANSLATING HALLMARKS INTO DIAGNOSES

08.30 – 09.15 Hallmarks of cancer

09.15 – 10.00 Diagnostic prognostic and predictive use of hallmark based parameters

10.00 – 10.30 Discussion

**10.30 – 11.00 Coffee**

#### DIAGNOSTIC MOLECULAR TESTS IN THE PRACTICE OF PATHOLOGY

11.00 – 11.45 Lung cancer KRAS and EGFR

11.45 – 12.30 Other markers in lung cancer phase protein arrays

12.30 – 13.00 Discussion

**13.00 – 14.30 Lunch & Visit Biobank (optional)**

14.30 – 15.30 Round table

**16.00 Social event**

## THURSDAY, APRIL 3, 2014

### DIAGNOSTIC MOLECULAR TESTS IN THE PRACTICE OF PATHOLOGY

08.30 – 09.15 Identity testing

09.15 – 10.00 Predictive biomarkers and drug resistance mechanisms

10.00 – 10.30 Discussion

**10.30 – 11.00 Coffee**

11.00 – 11.45 Hereditary colon cancer

11.45 – 12.30 Predictive markers in colon cancer

12.30 – 13.00 Discussion

## THURSDAY, APRIL 3, 2014

**13.00 – 14.00 Lunch**

### TISSUE BASED PROTEOMICS: INTRODUCTION TO PROTEOMICS IN FIXED AND PARAFFIN EMBEDDED TISSUES

14.00 – 14.45 2D electrophoresis and reverse phase protein arrays

14.45 – 15.30 MS based proteomics

15.30 – 16.00 Discussion

**16.00 – 16.30 Coffee**

16.30 – 17.15 Predictive markers in soft tissue tumors

17.15 – 18.00 Predictive markers in hematological malignancies

18.00 – 18.30 Discussion

## FRIDAY, APRIL 4, 2014

### DIAGNOSTIC MOLECULAR TESTS IN THE PRACTICE OF PATHOLOGY

08.30 – 09.00 Diagnostic approaches in hereditary breast cancer

09.00 – 09.45 Breast cancer

09.45 – 10.15 Discussion

**10.15 – 10.45 Coffee**

10.45 – 11.30 Circulating tumor cells and DNA

11.30 – 12.30 Ethical & legal requirements for molecular pathologic research and diagnostics

12.30 – 13.00 Discussion

**13.00 – 14.00 Lunch**

### DERMATOPATHOLOGY AND INFECTIOUS DISEASES

14.00 – 14.45 Predictive markers in melanoma

14.45 – 15.30 Diagnostic use of molecular techniques for viral and bacterial disease

15.30 – 16.15 HPV biology and testing

**16.15 – 16.45 Coffee**

16.45 – 17.30 Self-evaluation test

17.30 – 18.00 Feedback, Concluding remarks

The final program with all speakers will be announced on the course website:

<http://www.medunigraz.at/pathologie/molpathcourse14>

### ACCREDITATION / COURSE CERTIFICATE:

The Austrian Medical Chamber has granted 47 credit points (DFP) to the event. European CME credits by the EACCME (European Accreditation Council for Continuing Medical Education) have been requested. The accreditation process is still in progress.