

Announcement:

Workshop of the Section Biomedicine of the GSLS

“Genomic instability, DNA Damage and DNA Damage Response”

When: 25th and 26th of November 2014

Venue: Institute of Pharmacology and Toxicology, University of Würzburg, Versbacher Str. 9, 97078 Würzburg

Organizers: E. Eylül Bankoglu, Prof. Dr. Helga Stopper; For questions and enrolment please mail to:
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Fees: this is a GSLS-supported workshop. There are no fees for the participants.

This workshop will focus on the assessment of genomic instability, DNA damage response and repair activity/capacity in mammalian cells. On the first day, three invited speakers will present various aspects of DNA damage and damage response in mammalian cells. There will be an opportunity for up to 4 PhD students to present their related work as short talks. There will be sufficient time for intensive discussion with all speakers. Up to 40 places are available for GSLS students and PostDocs/Pis for this part. On the second day, Dr. Sabine Langie will teach her method of measuring capacity of the cells for DNA repair using a modified comet assay in the lab of the working group Stopper. Up to 5 places are available for PhD students of the GSLS to join this practical lab exercise. If more than 5 students apply for this part, we will add another lab exercise day, then taught by E. Eylül Bankoglu at a later date.

Planned time schedule:

25th of November 2014 (Kolloquiumsraum (behind main lecture hall, 1. floor))

10:00 Welcome and Introduction

10:15 **Jacob G. Jansen**

“Genome instability following mitotic transmission of unrepliated DNA lesions”

11:00 **Erik Danen**

“Exploring the DDR signalling network through a systems biology approach”

11:45 Coffee Break

12:00 Short Talks from PhD Students

13:00 Lunch

14:00 **Sabine Langie**

“Using the comet assay to study DNA repair: progress in the past decade”

15:00 Coffee Break

15:15 **Sabine Langie**

“How to prepare a comet-based in vitro repair assay”

26th of November 2014

Conference Room (Room Nr. 121, 1. floor); we will meet there and have a brief introduction into the day, then Dr. Sabine Langie with the help of her colleague will show the repair-comet assay in the lab. Everyone gets to practice the important steps including evaluation of results.

Using the comet assay to study DNA repair: progress in the past decade

Sabine A.S. Langie

Environmental Risk and Health unit, Flemish Institute of Technological Research (VITO), Mol, Belgium

The comet assay is a versatile and sensitive method for measuring strand breaks in DNA. The first paper on this single-cell gel electrophoresis assay was published in 1984 by Ostling and Johanson (*Biochem. Biophys. Res. Commun.*, 1984), meaning that this year we are celebrating 30 years of the comet assay. This assay (with and without inclusion of lesion-specific enzymes) is widely used as a biomarker assay in human population studies - primarily to measure DNA damage, but increasingly also to assess the capacity of cells for DNA repair. Ostling and Johanson were also the first to report experiments to measure DNA repair, by simply following the decrease of DNA damage over time after challenging cells with ionising radiation. However, this approach is time-consuming and laborious, and therefore not ideal for biomonitoring studies, which typically require high-throughput processing of many samples. As an alternative approach, the *in vitro* comet-based repair assay was developed: a cell extract is incubated with a DNA substrate containing specific lesions, and DNA incisions accumulate. The *in vitro* comet-based repair assay was first devised to measure base excision repair in lymphocytes (Collins et al., *Mutagenesis*, 2001). However, over the past decade it has been modified and improved to study incision of other lesions and thus other repair pathways, as well as being applied to tissue samples in addition to cell suspensions. In my presentation I will give a short overview of the history of the *in vitro* comet-based repair assay and the contributions I have made in this area of research. The application of the *in vitro* repair assay in dietary intervention, environmental biomonitoring and animal studies will be discussed.

Information about speakers:

Jacob G. Jansen Senior Scientist at Leiden University of Medical Center, Netherlands
Interest of area is replication-associated mutagenesis

Erik Danen Associated Professor at Leiden Academic Center for Drug Research,
Netherlands
Interest of area is cell adhesion signaling and tumor/ metastasis formation

Sabine Langie PhD at Flemish Institute for Technological Research (VITO), Belgium
Interest of area is nutritional modulation of DNA repair

Reading Materials:

1. Godschalk RW, Ersson C, Riso P, Langie SA, van Schooten FJ, Azqueta A, et al. DNA-repair measurements by use of the modified comet assay: an inter-laboratory comparison within the European comet assay validation group (ECVAG). *Mutat Res.* 2013; 757(1):60-7.
2. Azqueta A, Langie SA, Slyskova J and Collins AR. Measurement of DNA base and nucleotide excision repair activities in mammalian cells and tissues using the comet assay a methodological overview. *DNA Repair* 2013, 12(11):1007-10.
3. Gorniak JP, Cameron KM, Waldron KJ, Mathers JC and Langie SA. Tissue differences in BER-related incision activity and non-specific nuclease activity as measured by the comet assay. *Mutagenesis* 2013, 28(6):673-81.