

Dr Vassilis Roukos joins IMB to study cellular mechanisms maintaining genome integrity

1 April 2015. *The Institute of Molecular Biology (IMB) in Mainz, Germany, is delighted to welcome Dr Vassilis Roukos as a new Group Leader. Dr Roukos has recently developed novel high-throughput imaging tools, which he will use at IMB to explore the roles of chromatin organisation in genome stability and maintenance.*

Cells employ a battery of defences to protect themselves in case their DNA becomes damaged. Usually, these mechanisms recognise the damage and either repair it or trigger cell death. However, if they repair the DNA incorrectly, dangerous mutations and genome rearrangements can arise. This can particularly be the case if both strands of the DNA are cut through (a double-strand break). The resulting DNA ends can be unfaithfully repaired within the same chromosome, generating dangerous mutations, or can be illegitimately joined with another end of a different chromosome, resulting in the formation of chromosome translocations. Depending on the location of the breaks, translocations can lead to the formation of chimeric fusion genes or alter gene expression. Either case could result in changes to normal gene function, which could mark a significant step towards the cell becoming cancerous.

Dr Roukos' group at IMB will be investigating different aspects of cells' responses to double-strand DNA breaks and genome maintenance. This will include unravelling the epigenetic pathways involved in recognising and repairing breaks, and exploring how illegitimate repair leads to the formation of oncogenic chromosome translocations.

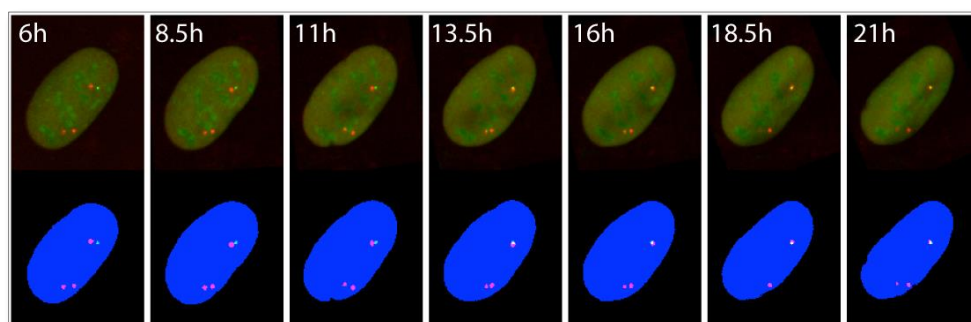


Figure 1. *High throughput microscopy (top) and image analysis (bottom) of a cell nucleus allow the visualisation and tracking of double-strand breaks (red and green spots) as they synapse and form translocations (yellow spots) in real time.*

Prior to joining IMB, Dr Roukos was a National Institutes of Health (NIH) Research Fellow in the lab of Tom Misteli at the National Cancer Institute in Bethesda, Maryland, USA. There, he developed novel high-throughput microscopy tools that enabled him to visualise for the first time how chromosome translocations form within the mammalian cell nucleus in living cells (Roukos *et al*, 2013). At IMB, Dr Roukos will use advanced high-throughput imaging approaches (Figure 1), in combination with novel genomic tools, to help uncover the roles of chromatin organisation in genome stability and maintenance.

Further details

Further information about Dr Roukos's research can be found at www.imb.de/roukos.

Reference

Roukos V, Voss T, Lee S, Meaburn K, Wangsa D, Misteli T (2013). Spatial dynamics of chromosome translocations in living cells. *Science* **341**, 660-4.

About the Institute of Molecular Biology gGmbH

The Institute of Molecular Biology gGmbH (IMB) is a centre of excellence in the life sciences that was established in 2011. Research at IMB concentrates on three cutting-edge areas: epigenetics, developmental biology, and genome stability. The institute is a prime example of a successful collaboration between public authorities and a private foundation. The Boehringer Ingelheim Foundation has dedicated €100 million for a period of 10 years to cover the operating costs for research at IMB, while the state of Rhineland-Palatinate provided approximately €50 million for the construction of a state-of-the-art building. For more information about IMB, please visit: www.imb.de.

About the Boehringer Ingelheim Foundation

The Boehringer Ingelheim Foundation is an independent, non-profit organisation committed to the promotion of the medical, biological, chemical, and pharmaceutical sciences. It was established in 1977 by Hubertus Liebrecht (1931-1991), a member of the shareholder family of the company Boehringer Ingelheim. Through its PLUS 3 Perspectives Programme and Exploration Grants, the foundation supports independent group leaders; it also endows the internationally renowned Heinrich Wieland Prize as well as awards for up-and-coming scientists. The foundation has granted €100 million over a period of ten years to finance the scientific activities of the Institute of Molecular Biology (IMB) at Johannes Gutenberg University Mainz.

Press contact for further information

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