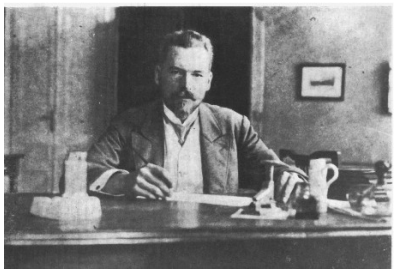

Contribution ID: **44** Type: **Regular talk**

Multimodal approach in research on DNA damage

Saturday, 17 September 2022 17:15 (25 minutes)

Double-strand breaks (DSBs) of DNA are the most dangerous type of DNA lesions. Unrepaired DSBs may lead to cell death or cancer driving mutations. A deep understanding of the nature of DSBs, DSBs-related structural modifications of DNA, and repair process of DNA damage is critical to the maintenance of genomic integrity in all forms of life. In this presentation, a statistic-based approach for DNA double-strand breaks analysis based on the distribution of DNA fragments length derived from atomic force microscopy (AFM) images will be reported. The presented method relies on the fraction of the longest strands observed in the length distribution of DNA fragments, thus, it allows determining the accurate number of DSBs even in the case of limited image resolution [1]. DNA fragmentation was induced by the exposure to an anticancer chemotherapeutic drug, bleomycin (Blm). Moreover, the combination of AFM to visualize the products of DNA cleavage induced by Blm with their chemical characterization by SERS (surface-enhanced Raman spectroscopy) will be presented. An application of a statistical model enabled simultaneous analysis of AFM and SERS results and to observe a corelation of the conformational transition from B- to A-DNA with the decreasing average length of DNA fragments upon the bleomycin treatment [2]. Additionally, an application of SPM-based molecular nanospectroscopy, which poses a natural next step in characterization of local structural rearrangements of the DNA molecule exposed to damaging factors will be discussed.

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References

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[2] S. Seweryn, et al., Scientific Reports, 2022, accepted article

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