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MTE Claudia Rübe

The group of Claudia Rübe is head of the laboratory of molecular oncology and dealing with different radiation oncology related topics.

One the one hand her group is investigating about the relationship of DNA damage and cellular senescence in stem cells. Therefore DNA repair in stem cells from different organs are analyzed. It could be shown that DNA damage increases with time and that stem cells protect the genomic integrity.

On the other hand she is dealing with genetic predispositions in children suffering from cancer, for which she is evaluating blood samples due to their availability to repair DSBs by using immune fluorescence microscopy. By that IR induced foci in NHEJ and HRR can be examined. Furthermore the DSB repair in context of the chromatin is evaluated. Since the local chromatin structure is important for the detection of DNA damage and recruitment of DNA repair proteins, the local modification by DNA damage and the structure of chromatin are explored. With high resolution transmission electron microscopy (TEM) immune gold labeled DNA repair proteins (Ku70, Ku80, DNA-PKcs) can be detected even in low concentrations, so the technique is suitable for the analysis of the DNA repair protein recruitment.

Furthermore, accumulation of DNA damage in complex normal tissues after protracted low-dose radiation is examined. Therefore TEM is used to detect γH2A.X and 53BP1 foci within the chromatin structure after low dose irradiation.

In her talk Prof. Rübe explained the analyses of the recruitment of DNA repair proteins by using gold-labelled secondary antibodies and TEM (transmission electron microscopy). By comparing the TEM technique with immune fluorescence microscopy and conventional microscopy it was shown that TEM technique is suitable to detect Ku70 foci in low concentrations. Moreover, the influence on the accumulation of DNA damage foci comparing low LET using photons und high LET using carbon ions were investigated. The group could show that repair factors accumulate at the boarder of DCR (decondensed chromatin region). Additionally, the protein Kap1 was identified to be phosphorylated by ATM, which leads to the decondensation of chromatin.

Christian Kalthoff and Isabell Götting