

# Tethering of ecDNA to Chromosomes during Mitosis in Cancer Cells

Luxembourg (together with Switzerland and Poland)

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| <p><u>Quote:</u></p> <p>“Our study delivered important evidence on the MDC1- TOPBP1 complex involvement in ecDNA tethering. Our results show that interruption of those protein interactions resulted in decreased tethering. As ecDNA is one of the factors enabling tumors to maintain heterogeneity, it is crucial to understand the mechanism underlying its inheritance. We believe our research brought us closer to reaching that goal.”</p> <p><u>Origin of the quote:</u></p> <p>The conclusion of our report which summarizes the importance of our results and how we were brought closer to research in ecDNA.</p> | <p style="text-align: center;"><b>Photo of the Project</b></p> <p style="text-align: center;"><i>Please do not copy the picture here- send it separately, in .jpg format</i></p>  |
| <p style="text-align: center;"><b>Photo of projector</b></p> <p style="text-align: center;"><i>Please do not copy the picture here- send it separately, in .jpg format</i></p>   | <p style="text-align: center;"><u>Vision:</u></p> <p>The aim of our study was to get closer to understanding the mechanism underlying tethering of ecDNA during cell division. To reach that objective, we proceeded with fluorescent in situ hybridization (FISH), immunofluorescence staining (IF) and immunofluorescent staining in situ hybridization (IF-FISH) protocols on samples of cervical cancer cell line (HeLa) with ecDNA treated with various concentrations of Casein Kinase Inhibitor (CX4945), which affects interaction of TOPBP1 and MDC1 proteins.</p> |

Bio of projector:

Petra is currently studying towards a Bachelor of Life Sciences at HAN University of Applied Sciences in Nijmegen, the Netherlands. She previously studied and graduated from International School Michel Lucius in Luxembourg, Luxembourg. She first participated in the National Jonk Fuerscher Contest (FJSL) in 2022 with her project 'Bacteria with Headphones.' This project won her the award to attend the 'Taiwan International Science Fair' in which she participated in, in February 2023. She then participated for a second time in the Jonk Fuerscher Contest by the FJSL in march 2023 with her project 'Acid Against Anxiety' and won the participation to ISSI.

Petra has participated in plenty of scientific workshops and internships on top of doing sciences during her A-level classes, which gave her a lot of experience in the scientific field. She has loved science since the beginning of high school which pursued her to continue studying science at university level.

Activity: Extrachromosomal DNA (ecDNA) emerges as a result of DNA amplification and is present in many diverse cancer types leading to therapy resistance and poor patient outcome. The random inheritance of ecDNA leads to enhanced tumour heterogeneity. It was shown that the TOPBP1 and MDC1 proteins are involved in tethering acentric fragments of chromosomes that had DNA damage, therefore we thought they might have a role in tethering other acentric fragments such as ecDNA. Using the drug CX4945 allowed us to assess the role of TOPBP1 and MDC1 in ecDNA inheritance. We are suggesting that TOPBP1 and MDC1 are vital for tethering of ecDNA to chromosomes.

Project website address: