

Abstract

Characterization of the proteotoxic stress burden of head and neck cancer cells

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In collaboration with the Dept. of Otorhinolaryngology and the Institute of Pathology, this project will determine the levels of proteotoxic stress of head and neck cancer cells by using molecular physiological markers. Subsequently, we will determine how exactly cells are able to keep a balanced proteostasis to ensure their survival.

Detailed project description

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While genetic instability is a well-established hallmark of many cancer cells, causing some cells to harbour up to thousands of missense and nonsense mutations, very little is known about how this burden to the cell's protein quality control system is addressed at the molecular level and in addition, whether there are additional benefits of this phenomenon besides allowing cancer cells to escape drug treatment.

We will therefore investigate which signalling cascades are activated by the proteotoxic stress and which physiological processes are compromised. Initially, proteomics and RNA sequencing will be employed to identify candidate proteins that will be validated by cell based assays. In addition, we will identify proteins that aggregate or are present in a polyubiquitinated form because of proteasome overload. These data will identify markers for the quantification proteotoxic stress levels.

The second line of investigation will address the mechanisms by which proteotoxic stress signalling cascades are activated and how the function of key regulatory proteins maintains balanced proteostasis.

<https://www.uni-due.de/zmb/microbiology/index.php>