

CELL SIGNALING IN INFLAMMATORY ASSOCIATED DISEASES

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SUMMARY & MISSION STATEMENT

We investigate the molecular mechanisms of inflammation-associated diseases (i.e. cancer) with a special focus on signalling events in cancers that are regulated by protein ADP-ribosylation. We aim based on this detailed knowledge to lay the foundation for novel diagnostic and therapeutic approaches.

OVERVIEW

My laboratory has a long-standing interest in understanding molecular mechanisms of inflammation-associated diseases of which cancer is a major topic. We investigate the role of post-translational modifications (PTM), particularly ADP-ribosylation, in the regulation of cancer development and progression and found that ADP-ribosylation as a crucial process in the cellular response to detrimental stimuli, be it through genotoxicity, oxidative or metabolic stress. Furthermore, we investigate the involved key enzymes, such as writers, readers and eraser of ADP-ribosylation, as well as their target proteins that carry this PTM. We focus on the following questions: (i) Which ADP-ribosylation patterns are cell-type specific and/or stimulus-specific? (ii) What are the modifiers (writer, binders, erasers) involved in those patterns and how are they regulated? (iii) What are the downstream events of ADP-ribosylation, i.e. how does ADP-ribosylation alter the function of specific proteins and what is the effect on cell physiology?

We have been involved in several breakthrough discoveries such as the mass spectrometry-based identification of the ADP-ribosylome (modified proteins and their acceptor sites) in cells and tissues, as well as the generation of antibodies that recognize ADP-ribosylated peptides and reveal tumor tissue-specific ADP-ribosylation.

SELECTED CANCER RELATED PUBLICATIONS

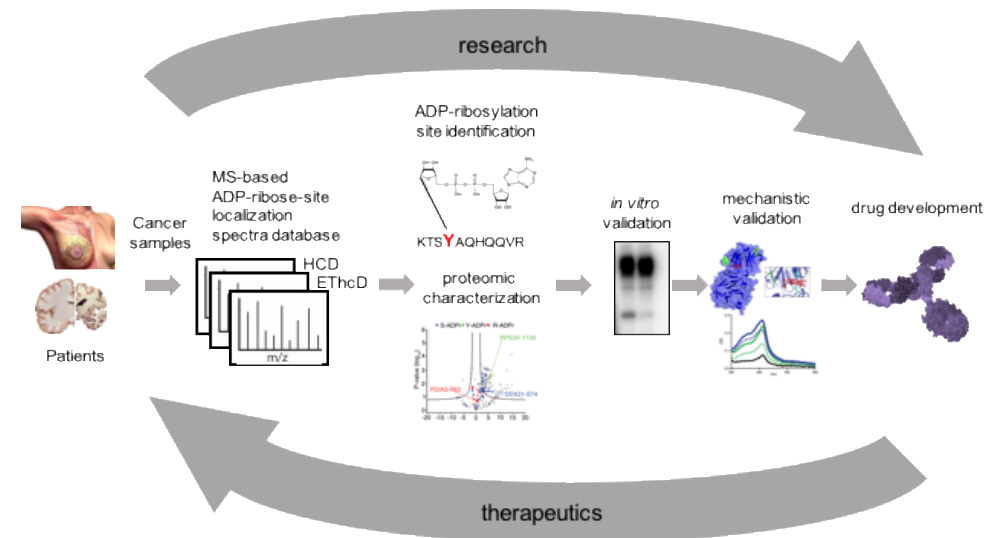
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Description of the MS-based platform for the identification of cancer specific ADP-ribosylation profiles that lay the foundation for the development of novel diagnostic and therapeutic approaches.