**Metabolic reprogramming and cancer progression**

The reprogramming of cellular metabolism is a well-established hallmark of cancer. It is essential for the production of fuel, cellular biomass (i.e., nucleic acids, proteins, and lipid macromolecules), redox balance to support cancer development and progression. As metabolic adaptation in cancer cells is driven by genomic alterations that dictate specific metabolic dependencies, it is also greatly influenced by systemic metabolism and by changes in nutrient availability that occur in obese individuals or in those consuming unbalanced diets (e.g., carbohydrate and/or fat-rich diets). Several groups, including ours have demonstrated that metabolic changes affect epigenetic rewiring (1), endothelium reticulum (ER) stress (2), and DNA damage responses. Recent evidence has also highlighted the role of metabolites as mediators of tumor/tumor microenvironment (TME) crosstalk, including the symbiosis between tumor cells and their associated fibroblasts and the antagonist immune cells to promote cancer progression and therapy resistance.

Thus, the understanding of how cancer cells exploits intra-tumor metabolome rewiring for their own advantage is crucial to develop new therapeutic strategies, involving both pharmacological targeting as well as diet interventions.

Prostate cancer (PCa) is the second most common cancer worldwide and fifth leading cause of death in men. Treatment of advanced PCa remains a challenge, and available therapies provide only short-term benefits, urging for new therapeutic strategies. Dr. Zadra investigates metabolic reprogramming, in particular of lipid metabolism, during progression of prostate cancer using *in vivo* animal model systems, *ex vivo* organotypic cultures, and clinical samples. Her research integrates metabolomics, transcriptomics, and metabolic imaging approaches to understand how both genetic context and systemic metabolism shape prostate cancer metabolism to promote disease progression and therapy resistance.

The three main research areas are the following:
1. Understanding the role of diet and obesity in shaping tumor/TME metabolic crosstalk to promote prostate cancer progression.
2. Identifying and targeting metabolic vulnerabilities that drive resistance to current standard of care to design more effective combination therapies (3)
3. Utilizing metabolomics and metabolic imaging to identify predictive and prognostic biomarkers in personalized medicine for prostate cancer (4, 5)

**References:**


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