

## **Comprehensive Seminar**

## Understanding the Bioenergetic heterogeneity across the regions of the small intestine and mitochondrial plasticity during metabolic challenges

## Sonia

The small intestine is anatomically divided into the Duodenum, Jejunum, and Ileum. Research has demonstrated the functional differences along these regions. Emerging evidence hints towards the differential mitochondrial capacity across the length, which might reflect distinct bioenergetic status tied to their physiological roles.

The metabolic complexity of the small intestine is further highlighted by its ability to absorb nutrients from both the luminal and basolateral sides. Portion of luminal-derived nutrients utilised by mitochondria to meet their own metabolic demands, thereby influencing the nutrients available for systemic circulation. During starvation, when dietary nutrients are absent from luminal sides, the small intestine relies on nutrients from systemic circulation, and the availability and profile of the metabolites alter with the duration of starvation. However, how the individual intestinal segment adapt their mitochondrial function and metabolic processes under such conditions remains poorly understood.

Adding another layer of complexity, Metabolic processes are synchronised with the day-night cycle through circadian cues. The day-night rhythm of the oxidative capacity has been demonstrated. Disruption of the temporal alignment between the fed-fast cycle and circadian rhythm is associated with the development of metabolic disorders. Similar regulation in the small intestine is largely unexplored.

The talk will highlight emerging evidence of the mitochondrial heterogeneity along the length of the small intestine, correlating with other tissues to speculate on the underpinnings of energetic status, and explore how mitochondria adapt in response to metabolic challenges.

## Friday, Jun 27<sup>th</sup> 2025 16:00 Hrs (Tea / Coffee 15:45 Hrs) Seminar Hall, TIFRH