SPATA5 and SPATA5L1 Mechanism Research

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Discovery

- SPATA5 is essential for a major cellular “cleanup and recycling” system called autophagy (from the Greek meaning “self-eating”). When SPATA5 does not function properly, this recycling process breaks down.
- As a result, damaged proteins accumulate like cellular waste, and persistent “danger” signals build up inside the cell, leading to harmful overactivation of the immune system.
- We also discovered that SPATA5 normally works together with another key autophagy protein to maintain this recycling pathway.

What tools were used?

- To better understand the range of diseases observed in patients with SPATA5/L1 mutations, we used a combination of cell culture systems, pre-clinical animal models, and patient-derived samples, along with genetic engineering, biochemical analyses, and computational research tools.

Hope & Future Research

- Goal: to further explain the molecular mechanisms underlying SPATA5/L1-related disease features. Through genetic interventions and pharmacological (drug) strategies, we aim to improve neurological outcomes in SPATA5-deficient pre-clinical animal models.

- Together with the SPATA Foundation, we also intend to build a patient registry and biorepository to facilitate long-term translational and clinical research.

Summary

- Overall, our findings show that SPATA5 plays a crucial role in keeping the cell's immune alarm system in check. This work provides new insight into how SPATA5 variants lead to neurological symptoms and highlights promising avenues for future therapeutic strategies.

- Additional work is ongoing to look at the same functions within SPATA5L1 models

Information about Autophagy

Autophagy: In simple terms, Autophagy is the body's natural cellular "housekeeping" process where cells break down and recycle old, damaged, or abnormal components to create new ones.

Recent research suggests that the process of Autophagy is an important part of understanding many disorders, not just neurological or neurodevelopmental, such as COVID and Diabetes, as well as the natural process of aging.

More research is needed to better understand the relevance of Autophagy to SPATA Related Disorder.