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EPIGENETICS • ENVIRONMENT
CELL PLASTICITY • CANCER

CLOTILDE CADART

Institut Cochin, Paris, France

CELL SIZE AND PLOIDY : FROM SINGLE CELLS TO THE PHYSIOLOGY OF VERTEBRATE EMBRYOS

11.FEBRUARY 2025 – 11 AM – LECTURE HALL

Genome copy increase (i.e. polyploidization) correlates cell size increase and is frequent in development, cancer, and throughout evolution. However, the ways ploidy and cell size impact cellular functions and animal physiology remain poorly understood.

To make progress, we are combining quantitative approaches in single-cells and *Xenopus* embryos. We generated triploid embryos and showed that triploid tadpoles are made of fewer, larger cells than diploids and consume oxygen at a lower rate. To understand the underlying basis of such decrease, we developed a mathematical framework to quantify the energy budget of tadpoles and combined it with quantitative measurements of the energy allocated to proliferation, growth, and maintenance. Results suggest that the increase in cell size in triploids causes a decrease in total cell surface area and a reduction of costs associated with activity at the plasma membrane which explains the overall lower metabolic rate. Crucially, comparison of three *Xenopus* species that evolved through polyploidization reveals that metabolic differences emerge in development only once cell size scales with genome size.

Ongoing efforts are focusing on understanding how cellular energetics vary with ploidy/cell size at the single-cell level and translate across scales to affect animal physiology across frog species.

Invited by : Corinne Albiges-Rizo/Laetitia Kurzawa

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Allée des Alpes, 38700 La Tronche (tram line B, stop : Grand Sablon)
The seminar is followed by discussions and exchanges with the speaker and a sandwich buffet is offered

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