The disassembly of organs during metamorphosis is a precise process orchestrated by hormones

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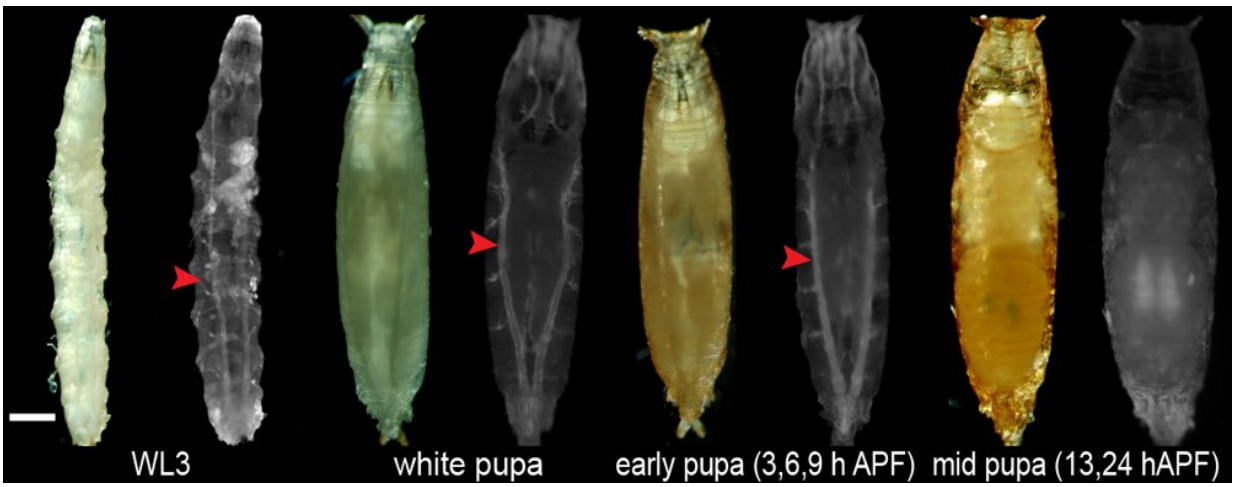

The first stage of progressive reduction can be observed followed by a second stage of dramatic reduction. Credit: (IRB Barcelona)

An important component of the development and growth of different parts of the human body is the disassembly of organs and structures from previous stages. The most obvious example is metamorphosis in insects, but this process also occurs in humans during the development of sex glands and during postlactational involution of the mammary gland.

A study co-led by Dr. Jordi Casanova, head of the Development and

Morphogenesis in Drosophila laboratory at IRB Barcelona and also IBMB-CSIC researcher, and Dr. Jérôme Solon, formerly at the center for Genomic Regulation and now a researcher at Ikerbasque, has described the disassembly of the Drosophila fly trachea during metamorphosis.

This process occurs in two stages. The first involves the shortening/shrinkage of the trachea, which leads to the compaction of cell membranes, thus triggering the second stage, which is characterized by cell death. In this second stage, not all the cells of the initial trachea die uniformly. The so-called progenitor cells are saved, thus allowing the development of the adult organ.

"In the end, aging is a stage of development, where there are structures that, due to use or wear, are disassembled. If we want to understand aging and work to promote health in old age, it is crucial to comprehend these processes," says Dr. Casanova.

Drs. Fraire-Zamora and Solon emphasized the need for these interdisciplinary collaborations for future discoveries. "An interesting aspect of this process, which leads to the disassembly of a multicellular organ, is the intricate involvement of physical mechanisms and biological signaling. Together, they regulate cellular decisions and organ remodeling. Therefore, this work highlights that to understand complex processes during animal development or disease, not only do we need to decipher the gene expression or the biochemical activity of cells but we also have to uncover their physical state and understand their mechanics."

The research was published in *Current Biology*.

More information: Juan J. Fraire-Zamora et al, Control of hormone-driven organ disassembly by ECM remodeling and Yorkie-dependent

apoptosis, *Current Biology* (2021). DOI: 10.1016/j.cub.2021.09.057