**Regulating the regulators: Steroid hormone synthesis is controlled by SUMO, Ftz-f1 and Scavenger Receptors.**

Steroid hormones are cholesterol derivates that control many aspects of animal physiology, including development, growth, energy storage and reproduction. In insects, the main steroid hormone is ecdysone, which gets activated in pulses that precede molting and metamorphosis. The regulation of hormonal synthesis is crucial for determining animal viability and size. Previous research by Rosa Barrio's group at CIC bioGUNE showed that the small ubiquitin-like modifier SUMO is necessary for the synthesis of steroids, since it is needed by the steroidogenic glands for cholesterol intake. Now, in a new study published in PLOS Genetics, they show that the role of SUMO in lipid intake is mediated by the Scavenger Receptors (Class B, type I). Using Drosophila genetics and confocal microscopy, the researchers demonstrate that the expression of the Scavenger Receptors is sufficient to recover lipid content in the glands when SUMO is removed. The expression of the Scavenger Receptors depends on Ftz-f1, a transcription factor homologous to human SF-1 (Steroidogenic factor 1). Like SF-1, they show that Ftz-f1 is also regulated by SUMOylation. The role of SUMO, Scavenger Receptors and Ftz-f1 on lipid intake is also conserved in other steroid-producing tissues, such as the ovaries. Since all of these factors are conserved in vertebrates, and mutations in SF-1 linked to endocrine abnormalities in human disease, this novel mechanism to regulate lipid uptake may have implications for human health and suggest new treatments for endocrine disorders.

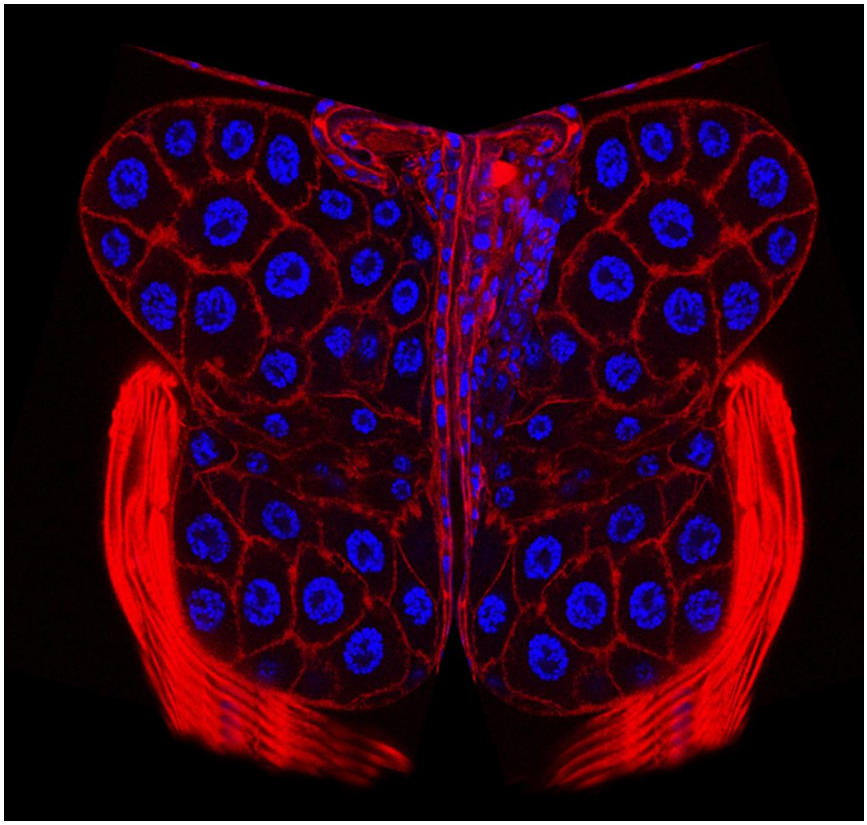

**Figure Captation:**
This confocal image shows a wild type *Drosophila melanogaster* ring gland. This gland is the equivalent to the mammalian adrenal gland. It is responsible for the synthesis of the cholesterol derived steroid hormone ecdysone, which controls animal growth and development. Talamillo and coworkers reported that the capture of lipids necessary for the synthesis of the hormone by the ring gland depends on the ubiquitin-like SUMO protein, the nuclear hormone receptor Ftz-f1 and the Scavenger Receptor Snmp1. The nuclei of the gland are marked with DAPI (blue) and the cell contours are marked by phalloidin (red). The image has been mirror-duplicated.

**Citation:**
Talamillo A, Herboso L, Pirone L, Pérez C, González M, Sánchez J, Mayor U, Lopitz-Otsoa F, Rodriguez MS, Sutherland JD, Barrio R (2013) Scavenger Receptors Mediate the Role of SUMO and Ftz-f1 in Drosophila Steroidogenesis. PLoS Genet 9(4): e1003473. doi:10.1371/journal.pgen.1003473

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