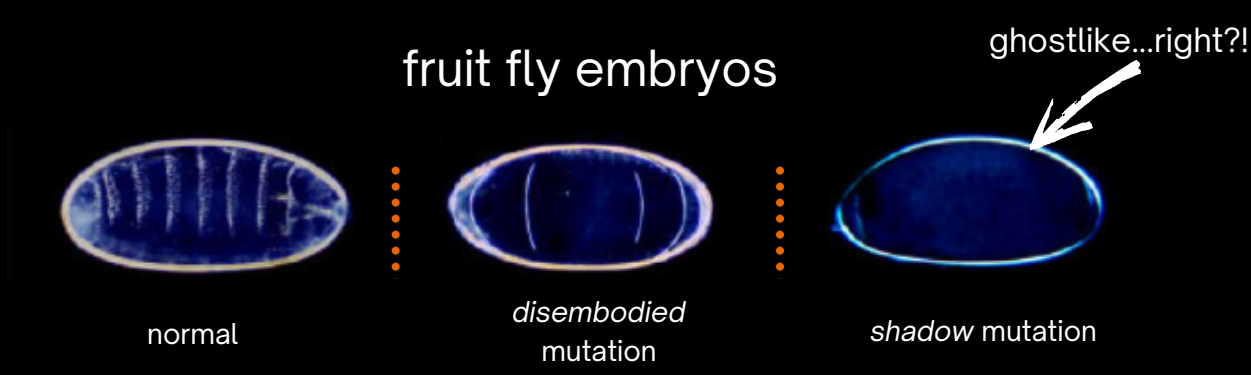
HALLOWEEN GENES

In the early 1980s, the Wieschaus & Nüsslein-Volhardthe research groups stumbled across a set of creepy genes in the fruit fly *Drosophila melanogaster.* The term "Halloween genes" was coined because mutations in these genes cause deformed exoskeletons that appear quite ghostlike and would lead to embryo death.



We now know that these genes code for enzymes in the **Cytochrome P450** family. They **play a role in converting cholesterol from their food to steroid hormones**! Because steroid hormones are responsible for processes like molting and exoskeleton formation, disrupting these genes will severely affect embryonic development. That's why embryos with Halloween gene mutations kinda look like ghosts!

SPOOK (AND SPOOKIER)

These genes are needed to make insect steroid hormones AKA ecdysteroids!

PHANTOM

DID YOU KNOW?

Insects also have hormones that help them go through "puberty". Instead of getting pimples and hair in weird places, insects shed their skin. It's called **molting**!

DISEMBODIED

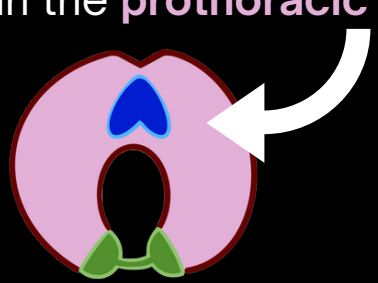
Mutations of these genes can cause fly embryos to:

- fail to successfully develop a head
- be unable to secrete a cuticle
- fail to completely form an exoskeleton

SHADOW

SHADE

These genes are expressed in the **prothoracic gland***.



RING GLAND
major endocrine gland located next to the brain

*except *shade* which is also expressed in other tissues like the gut

Created by Hannah Chu
Sources:
Gilbert. 2004. *Molecular and Cellular Endocrinology.*
Thurmond, et al., *Flybase*. version: FB2020_05