

Hormone clue to snail shells' spiral

November 20 2019, by Hayley Jarvis



Credit: Brunel University

An enzyme that makes the male sex hormones has unravelled a fresh clue about how snail shells come to be curly.

It's a new twist on how scientists thought snails and molluscs develop and form their distinctive whorly shells.

5-alpha-reductase (5 α R) is the enzyme humans use to convert hormones

needed to reproduce. Researchers turned off that same enzyme in developing snails and found their snails grew banana-shaped shells instead of spirals.

"Normally they look like ramshorn shapes, very tightly curled," said Dr Alice Baynes at Brunel University London. "But here they get very elongated, so something's happening when we disrupt their 5 α R".

"We're not sure if not having the enzyme stops the shells from curling, or if the curl isn't starting at the right angle. The enzyme is probably converting something into a [hormone](#) that helps shell patterning. They just get this really wide-open curl and when they keep growing for longer, their shells actually look like ring donuts."

In mammals, 5 α R converts the male sex hormone testosterone into the stronger male sex hormone dihydrotestosterone (DHT), an androgen which helps male development and reproduction. Snails and molluscs, like mussels and squid, also have the 5 α R [enzyme](#). But research shows that snails do not use either testosterone or DHT for reproductive development. So scientists wanted to discover what snails do use these hormones for.



Credit: Brunel University

In a study in Nature's latest *Scientific Reports*, the team used the drug dutasteride – which treats enlarged prostates – to block $5\alpha\text{R}$ enzymes in growing snail embryos.

"We found a surprising effect on snail shell development," said Dr Baynes. "The snail embryos grow elongated 'banana-shaped' shells instead of tightly curled shells".

"This disruption to shell shape is not what we might expect in a mammal or a fish, which would be reduced male characteristics or sperm production. Our findings indicate $5\alpha\text{R}$ has an essential role in [snails](#) and could lead to a better understanding of hormones and [shell](#) development in molluscs. It's an interesting first step."

More information: Alice Baynes et al. Early embryonic exposure of freshwater gastropods to pharmaceutical 5-alpha-reductase inhibitors results in a surprising open-coiled "banana-shaped" shell, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-52850-x](https://doi.org/10.1038/s41598-019-52850-x)

Provided by Brunel University

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