Behavioral Responses of Cultured White Abalone (*Haliotis sorenseni*) to Predatory Sea Stars in a Laboratory Experiment

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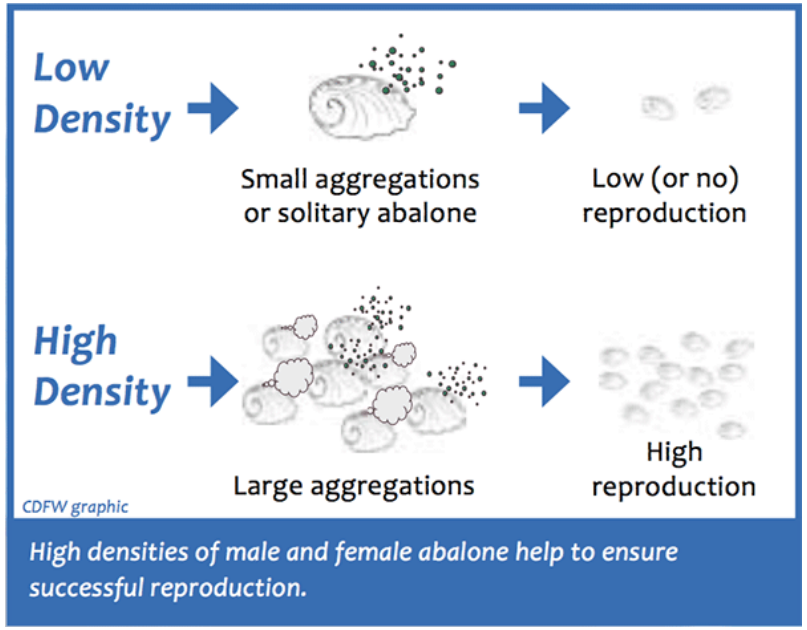
Major: Aquatic Biology

Mentor: Lindsay Marks, Ph. D

Fully grown white abalone (*Haliotis sorenseni*)



Low densities lead to low reproduction rates

A newly settled abalone larvae

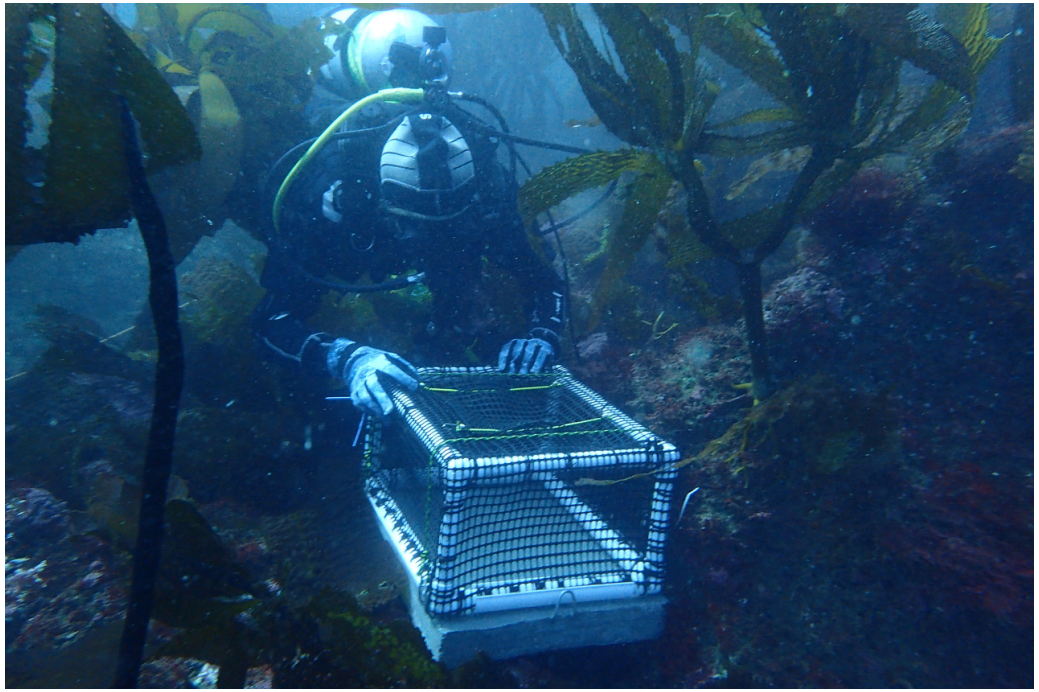
Abalone are a coveted sea snail

In the 1970's, they were overfished

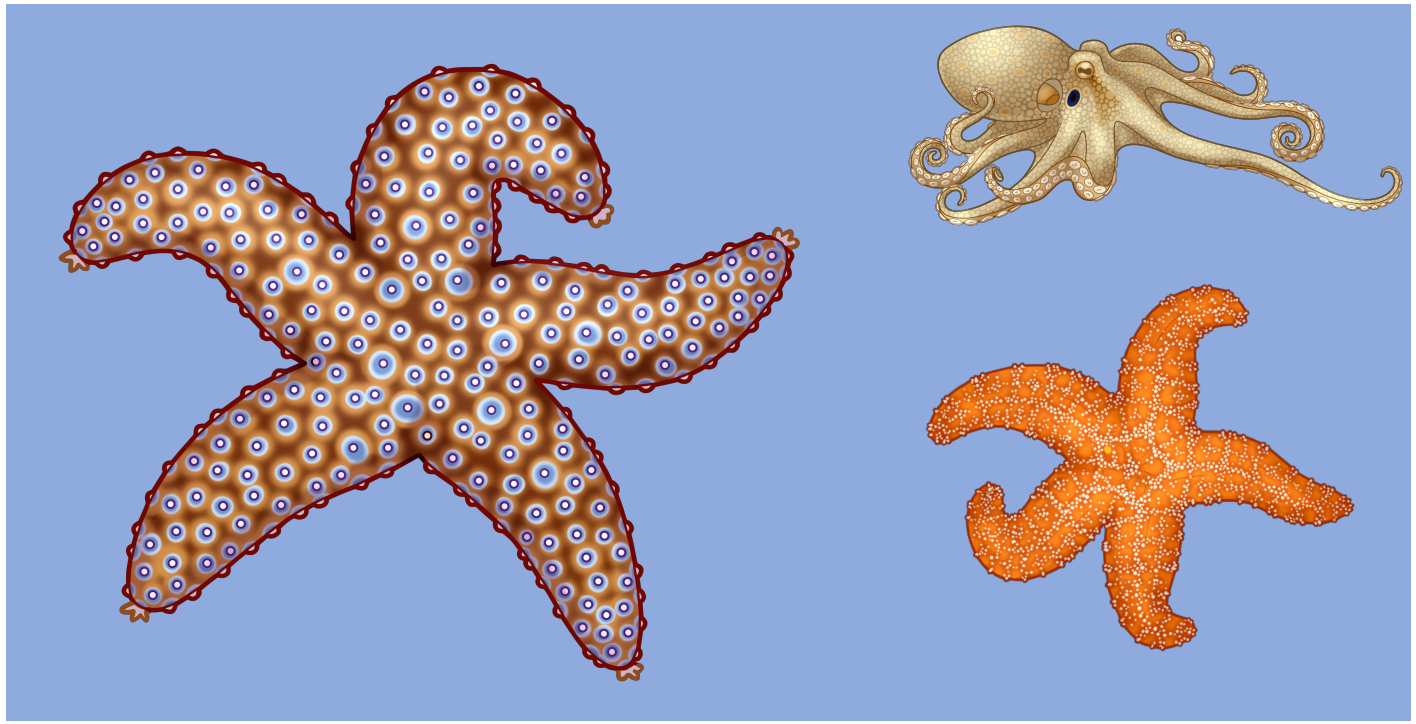
White abalone are threatened by low population densities.

Photos from Bodega Marine Lab

We’re finding the best method for introducing the captive bred white abalone to the wild



Introducing captive bred abalone to the wild in protective cages



Abalone Predators

Artwork from NOAA, BML, and Madi Clarke

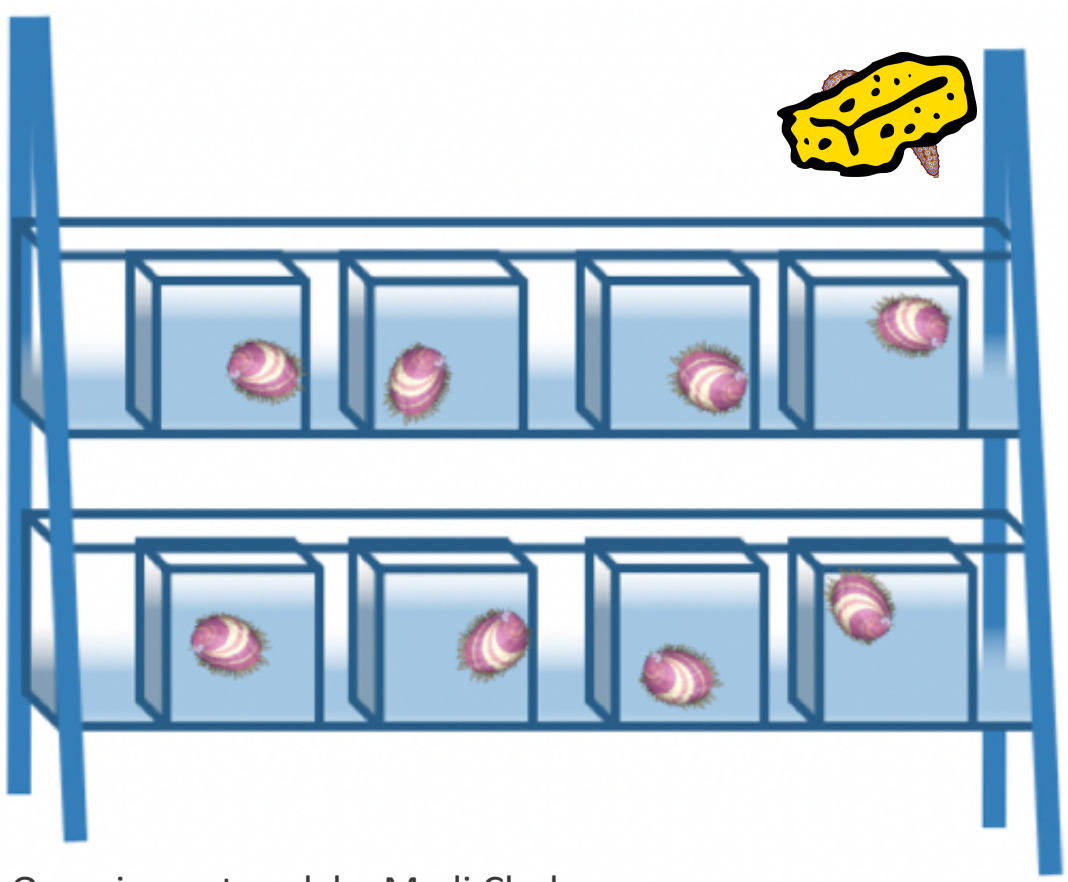
Worries remain about the wellbeing of captive-bred white abalone in the wild

Do cultured white abalone exhibit **defensive responses** to a natural predator?

Do these behaviors allow the white abalone to **escape** the predator?

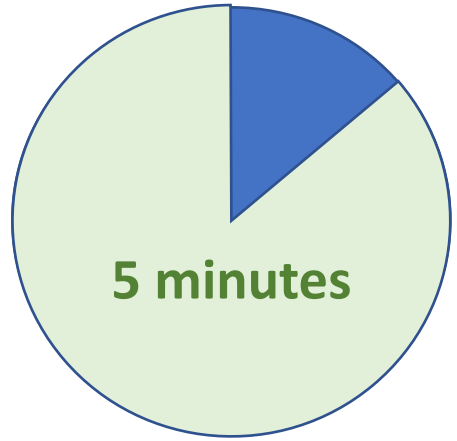
Can white abalone **learn** to escape more quickly after repeated exposure to a predator?

We compared reactions of abalone between a sponge and a sea star and between multiple exposures of the star



Organism artwork by Madi Clarke

Observation Period:

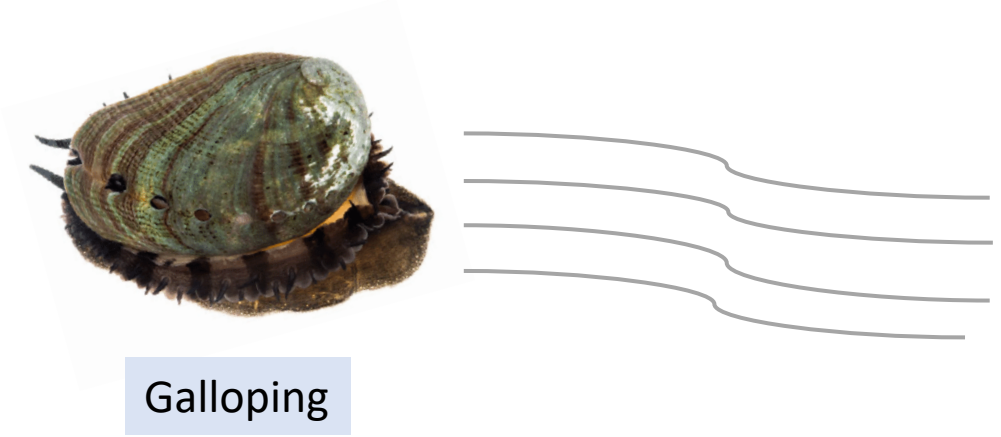


Control: Abiotic sponge
Treatment: Sea star

Exposure 1
Exposure 2
Exposure 3

Abalone exhibit distinct behaviors to predators

Twisting is effective for an abalone's escape



Galloping

Behavioral Responses

- Epipodial spreading - Abalone spread epipodial tentacles
- Galloping - Abalone moving in a certain direction
- Shifting - Abalone moving slowly, non-directionally
- Twisting - Shell rotates

Less Extreme Responses

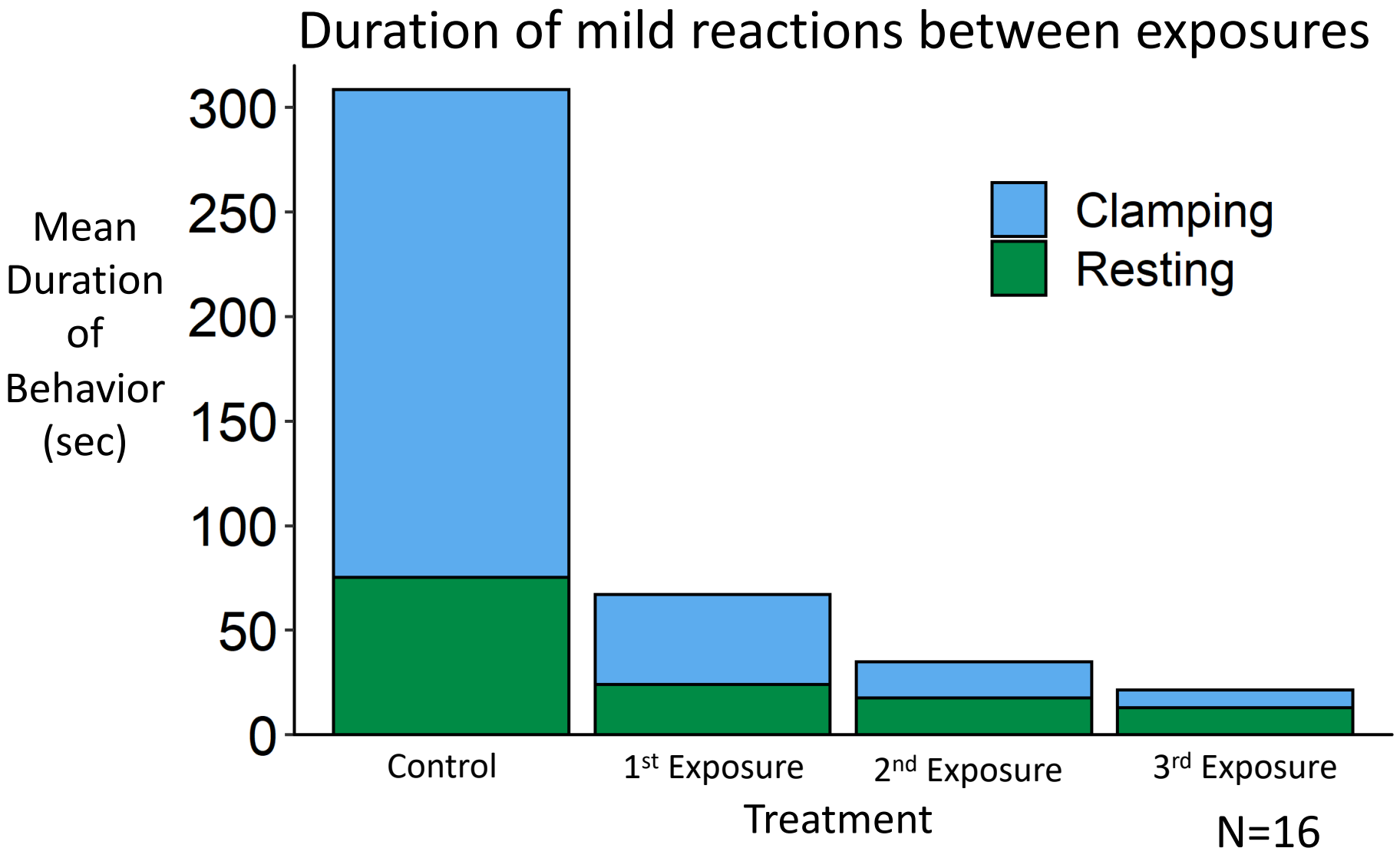
Resting – no reaction to stimulus

Clamping – abalone fastens to surface

Epipodial spreading

Photos taken by Michael Ready

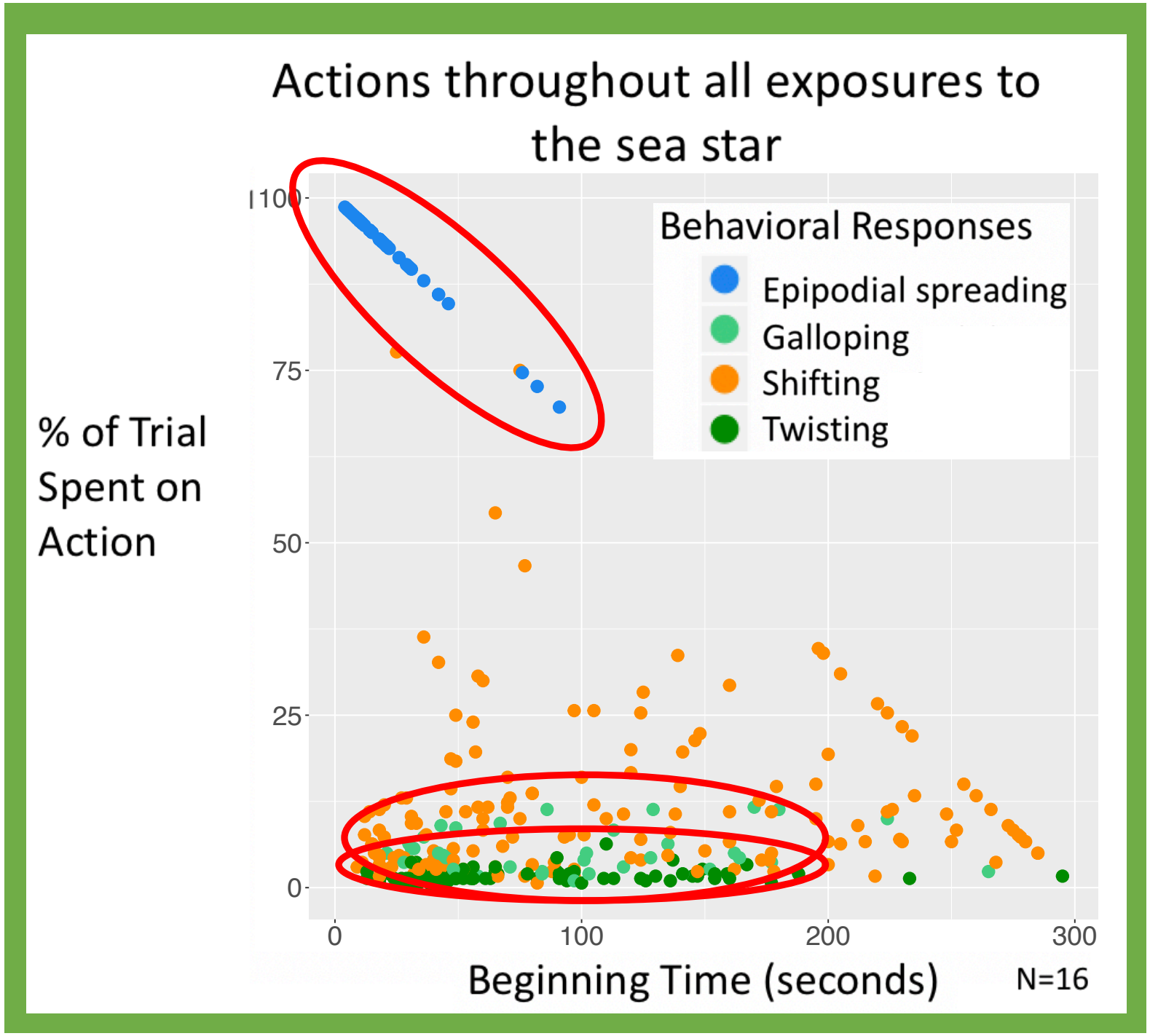
Mild reactions were observed longer in control trials



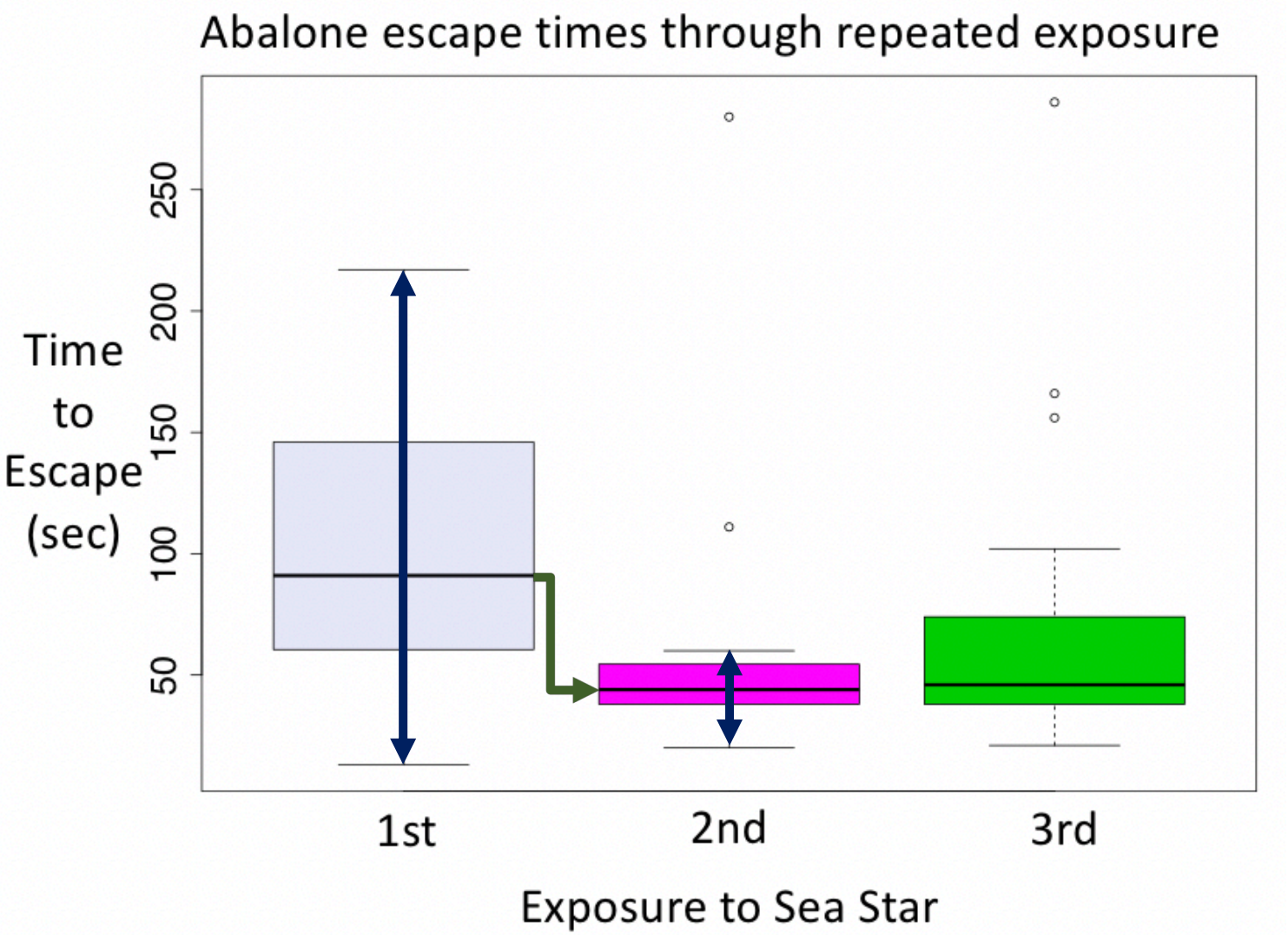
What does this mean?

They respond in **more extreme** ways when stimulated by a predator's touch

White abalone exhibit certain patterns in behavioral responses to predators



Abalone exhibit evidence of learning



They escape quicker after just one exposure

The difference between the ranges highlight that there are **more** abalone escaping quicker in later trials

What did we learn?

Do cultured white abalone exhibit **defensive responses** to a natural predator?

Yes!

Do these behaviors allow the white abalone to **escape** the predator?

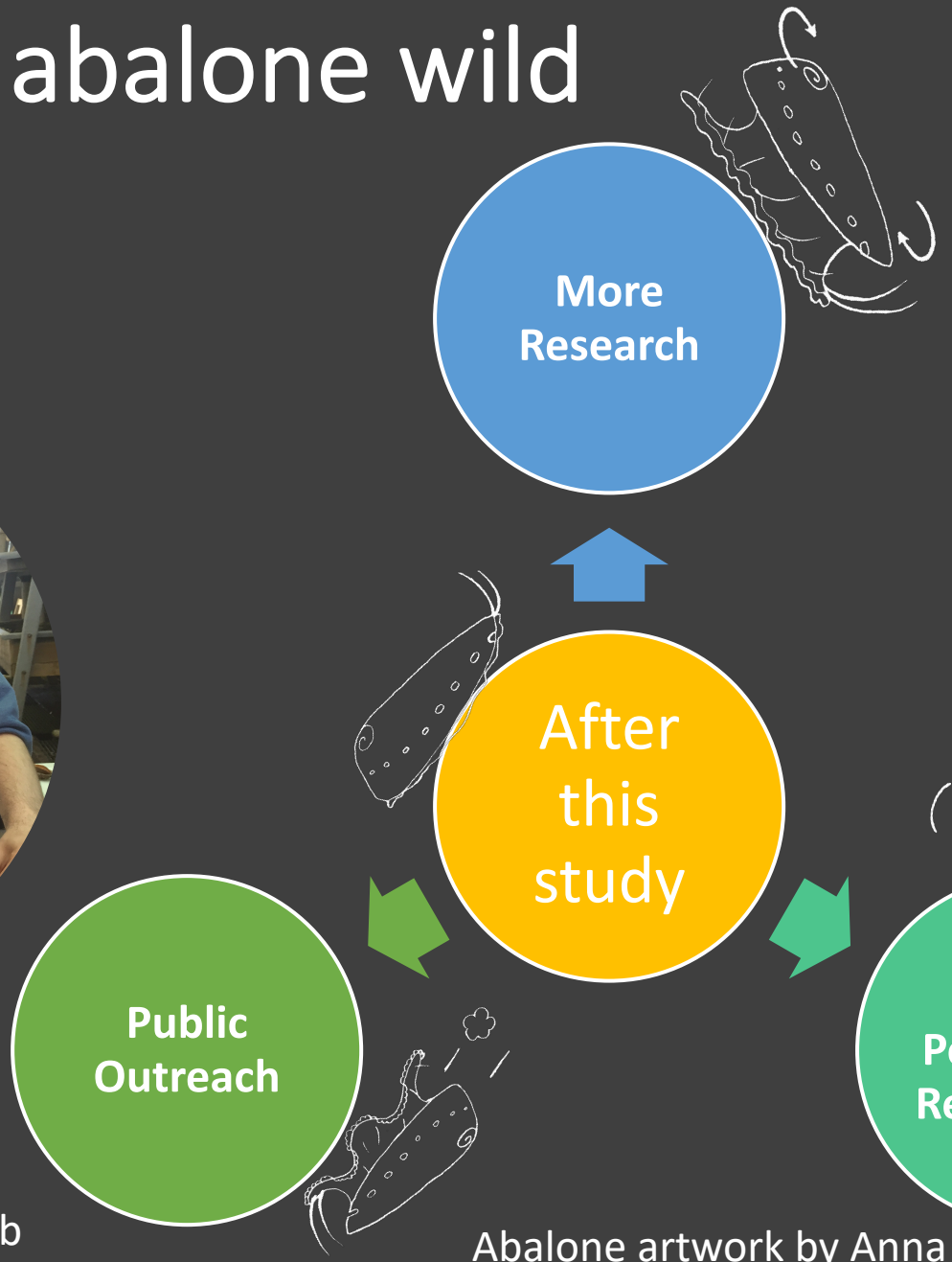
Yes!

Can white abalone **learn** to escape more quickly after repeated exposure to a predator?

Yes!

Keeping abalone wild

Photos from Bodega Marine Lab



Abalone artwork by Anna Thomasdotter

Acknowledgements

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And thank you to the REEF director, Scott Simon!

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