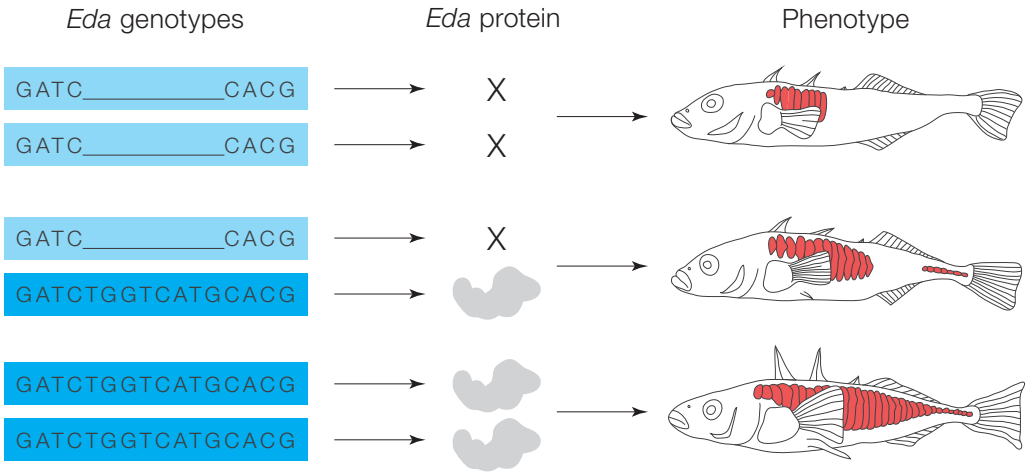
The Candidate Gene Approach

The Eda *Gene*

The Gene 2 DNA sequences are from the *Eda* gene.

Low-plated fish have 2 copies of the lighter *Eda* allele, and completely plated fish have 2 copies of the darker *Eda* allele. Partially plated fish have one copy of each. You looked at the DNA sequence of just a short piece of *Eda*. The entire gene is several thousand bases long, and the two alleles have several DNA differences between them.

Scientists don't know exactly how the DNA variations work, but the low-plated allele is not functional. It may make protein at the wrong time or place, or it may make no protein at all.



The low-plated *Eda* allele is common in populations of lake sticklebacks, but rare in ocean sticklebacks. This explains why we see mostly low-plated fish in lakes and mostly completely plated fish in the ocean.

Other animals have *Eda* genes too

Many other organisms also have an *Eda* gene that is very similar to the stickleback gene. In zebrafish, *Eda* plays a role in the formation of scales. In mammals, *Eda* is involved in the formation of skin, sweat glands, hair, teeth, and nails.

Why do fish have such a broad range of lateral plate numbers?

Eda is just one of several genes that influence lateral plate number. *Eda* has the biggest effect, but a number of other genes have minor effects. Variations in these genes might shift the number of lateral plates up or down by one or two.

Lots of other traits work this way too. For example, people with a 'brown' allele of a major gene that influences eye color will have brown eyes. But not all brown eyes look alike. Other genes influence the shade of brown, whether there are green flecks, and other variations.

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