

# Biology professors suggest instincts evolved from learning

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Honeybee (*Apis mellifera*) landing on a milk thistle flower (*Silybum marianum*).  
Credit: Fir0002/Flagstaffotos/ Wikipedia/GFDL v1.2

(Phys.org)—A pair of biology professors, one with the University of Illinois, the other with Macquarie University in Australia has proposed in a Perspective piece in the journal *Science* that the traits we see as instinctual in animals were likely learned by ancestors. In their paper, Gene Robinson and Andrew Barron suggest that those behaviors learned

by ancestors wound up in their DNA somehow, making them instinctual behaviors in later generations.

Scientists (and everyone else) know that certain behaviors in some animals are instinctual—they are hard-wired, which means that a given animal is able to do something without being taught. Birds can fly and migrate, for example, fish can swim, etc. But where did these innate abilities come from? That is the question posed by Robinson and Barron—they suggest many, if not all innate abilities arise due to an [ancestor](#) learning how to do something and then somehow passing that information along in their DNA.

To bolster their argument, the research pair note that [epigenetic changes](#) (nongenetic influences on gene expression) have been observed in the lab—a mouse exposed to Vinclozolin, for example, experiences changes to its DNA packaging—changes that can be passed down for three generations. As another example, they note that lab rats taught to react more calmly to stress events wind up behaving in ways that influence their offspring, which in turn causes them to react more calmly to such events—[behavior](#) that can also be passed on to a third generation. They also suggest that instinctual and learned behaviors are likely governed by the same neural circuitry, which means it might be possible that epigenetic changes could possibly be coded into DNA in some instances, allowing a learned response to become an instinctual response in offspring and their ancestors.

The pair suggest such a form of natural selection could lead to behaviors being adopted at increasingly early stages, until they appear as if hard-wired into the brain, which suggests they might display it even before a given stimuli had been encountered. They readily acknowledge that no such mechanism has been found for converting epigenetic changes into DNA changes, but note that epigenetics is still a young science and that such a mechanism could yet be found.

**More information:** Gene E. Robinson et al. Epigenetics and the evolution of instincts, *Science* (2017). [DOI: 10.1126/science.aam6142](https://doi.org/10.1126/science.aam6142)

## Summary

An animal mind is not born as an empty canvas: Bottlenose dolphins know how to swim and honey bees know how to dance without ever having learned these skills. Little is known about how animals acquire the instincts that enable such innate behavior. Instincts are widely held to be ancestral to learned behavior. Some have been elegantly analyzed at the cellular and molecular levels, but general principles do not exist. Based on recent research, we argue instead that instincts evolve from learning and are therefore served by the same general principles that explain learning.

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