

A young brain for an old bee

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While the bee scans the tactile stimulus with her antennae, proboscis extension is elicited. When the bee extends her proboscis, she is rewarded with a droplet of sucrose solution. Credit: Dr. Ricarda Scheiner

Scientists have found that by switching the social role of honey bees, aging honey bees can keep their learning ability intact or even improve it. The research team is hoping to use them as a model to study general aging processes in the brain and how to prevent or ameliorate cognitive impairments associated with old age.

We are all familiar with the fact that cognitive function declines as we get older. Moreover, recent studies have shown that the specific kind of daily activities we engage in during the course of our lives appears to influence the extent of this decline.

A team of researchers from Technische Universität Berlin are studying

how division of labour among honey bees affects their learning performance as they age. Surprisingly, they have found that, by switching their social role, aging honey bees can keep their learning ability intact or even improve it. The scientists are planning to use them as a model to study general aging processes in the brain, and they even hope that they may provide some clues on how to prevent them. Dr. Ricarda Scheiner, leader of the research team, will present these findings at the Society of Experimental Biology Annual Meeting in Glasgow on Wednesday 1st July 2009.



Honey bees, used as the experimental model, on an artificial comb. Nurses can be seen taking care of the brood. Credit: Dr. Ricarda Scheiner

The oldest bees in a colony are the foragers - a task that demands a high amount of energy. With increasing foraging duration, their capacity for associative learning was found to decrease. On the other hand, no decline was observed in nurse bees that remain inside the hive taking care of the brood and the queen, even though their age was the same as that of their foraging sisters. When the scientists artificially forced a subset of these foragers to revert to nursing tasks, they discovered that their learning performance improved again, demonstrating a remarkable plasticity in their [brain](#) circuits.

"The [honey bee](#) is a great model", explains Dr. Scheiner, "because we can learn a lot about social organisation from it and because it allows us to revert individuals into a 'younger' stage. If we remove all of the nurse bees of a colony, some of the foragers will revert to nursing behaviour and their brains become 'young' again. We thus hope to study the mechanisms responsible for age-dependent effects, like oxidative damage, and also to discover new ways to act against these aging processes."

Source: Society for Experimental Biology

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