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Dipl. Biol. Anika Libor (Korrespondenz-Autorin), Pamela Pirker BSc,
Univ.-Prof. Dr. Karl Crailsheim, Institut für Zoologie, Karl Franzens Universität,
Universitätsplatz 2, 8010 Graz. E-Mail: anika.libor@uni-graz.at

Trans-generational Immune Priming in Honeybees

J.H. LÓPEZ, W. SCHUEHLY, U. RIESSBERGER-GALLÉ & K. CRAILSHEIM

Maternal immune experience acquired during pathogen exposure and passed on to progeny to enhance resistance to infection is called trans-generational immune priming (TgIP). In eusocial insects like honeybees, TgIP would result in a significant improvement of health at individual and colony level. Demonstrated in invertebrates other than honeybees, TgIP has not yet been fully elucidated in terms of intensity and molecular mechanisms underlying this response. Here, we immune-stimulated honey bee queens with *Paenibacillus larvae* (*Pl*), a spore-forming bacterium causing American Foulbrood, the most deadly bee brood disease worldwide. Subsequently, offspring of stimulated queens were exposed to spores of *Pl* and mortality rates were measured to evaluate maternal transfer of immunity. Our data substantiate the existence of trans-generational immune priming effects in honeybees by direct evaluation of offspring resistance to bacterial infection. A further aspect of this study was to investigate a potential correlation between immune priming responses and prohemocytes-hemocyte differentiation processes in larvae. The results point out that a priming effect triggers differentiation of prohemocytes to hemocytes. However, the mechanisms underlying TgIP responses are still elusive and require future investigation.

Authors' addresses

Javier Hernández López (Corresponding author), Dr. Wolfgang Schuehly, Dr. Ulrike Riessberger-Gallé, Univ.-Prof. Dr. Karl Crailsheim, Institut of Zoology, University of Graz, Universitätsplatz 2, 8010 Graz, Austria. E-Mail: javier.hernandez-lopez@uni-graz.at

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Autor(en)/Author(s): Hernández-López Javier Hernández, Schuehly Wolfgang, Riessberger-Gallé Ulrike, Crailsheim Karl

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