Maternal carotenoid intake during gestation affects innate immune response of offspring in a matrotrophic viviparous reptile

Keisuke Itonaga, Susan M Jones, and Erik Wapstra
School of Zoology, University of Tasmania, Australia.

Innate immune response of offspring at birth protects against disease and parasites,and may be influenced by the degree of maternal investment of carotenoids In oviparous reptiles, yolk supplies carotenoids to the developing embryos. However matrotrophic viviparous (live-bearing) reptiles provide significant support for embryogenesis through the placenta, so placental transfer of carotenoids may occur. The effects of maternal carotenoid intake during gestation on the innate immune responses of offspring has not been studied previously in reptiles. We manipulated maternal β-carotene availability during gestation (i.e., dietary supplementation of β-carotene or no supplementation) in a matrotrophic viviparous lizard (*Pseudemoia entrecasteauxii*) and investigated innate immune response (i.e., tissue swelling and proportion of monocytes in response to antigenic stimulation) of offspring two days after birth. Subsequently, we investigated the effects of postnatal β-carotene intake on innate immune response using reciprocal transplant experiments in which we manipulated β-carotene availability for two weeks after birth. We found that innate immune response was enhanced by high maternal β-carotene intake during gestation, and that this effect persisted for two weeks after birth. Post-natal β-carotene intake further enhanced innate immune response. These results show that placental supply of carotenoid is important for offspring development in this matrotrophic lizard.