Life history traits and the evolution of maternal yolk thyroid hormones in birds: a comparative analysis

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Over past decades, studies of maternal androgens and glucocorticoids have demonstrated that maternal hormones are an important source of transgenerational phenotypic variation. Nevertheless despite their importance for development and growth, maternal thyroid hormones (THs) have been largely neglected in ecological and evolutionary context. Very recently, a few studies in birds have demonstrated a great potential of the natural variation of maternal THs in egg yolks to modify offspring phenotypes, for example, accelerating prenatal development and enhancing hatching success. In this study, we collected data for maternal yolk THs in 299 eggs from 34 bird species across 18 families with a variable size range, representing the whole continuum from precocial to altricial. A great deal of inter-species variation has been indicated by our preliminary analysis. With this unique dataset, we used a phylogenetic comparative analysis to explore the association between maternal THs with species’ developmental modes (altricial vs. precocial), incubation and nestling period, and migratory status for the first time. Because of the importance of THs on development and growth, we expect to see 1) higher maternal yolk THs in precocial species because of their more advanced developmental stage upon hatching 2) a negative association between maternal yolk THs and the length of incubation and nestling periods 3) higher maternal yolk THs in migratory species because of their relatively shorter breeding window. The results of this study thus will shed light on the evolutionary path of maternal thyroid hormones in avian species.