Yolk Formation in a Stony Coral *Euphyllia ancora* (Cnidaria, Anthozoa): Insight Into the Evolution of Vitellogenesis in Nonbilaterian Animals

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Vitellogenin (Vg) is a major yolk protein precursor in numerous oviparous animals. Numerous studies in bilateral oviparous animals have shown that Vg sequences are conserved across taxa and that Vgs are synthesized by somatic-cell lineages, transported to and accumulated in oocytes, and eventually used for supporting embryogenesis. In nonbilateral animals (Polifera, Cnidaria, and Ctenophora), which are regarded as evolutionarily primitive, although Vg cDNA has been identified in 2 coral species from Cnidaria, relatively little is known about the characteristics of yolk formation in their bodies. To address this issue, we identified and characterized 2 cDNA encoding yolk proteins, Vg and egg protein (Ep), in the stony coral *Euphyllia ancora*. RT-PCR analysis revealed that expression levels of both Vg and Ep increased in the female colonies as coral approached the spawning season. In addition, high levels of both Vg and Ep transcripts were detected in the putative ovarian tissue, as determined by tissue distribution analysis. Further analyses using mRNA in situ hybridization and immunohistochemistry determined that, within the putative ovarian tissue, these yolk proteins are synthesized in the mesenterial somatic cells but not in oocytes themselves. Furthermore, Vg proteins that accumulated in eggs were most likely consumed during the coral embryonic development, as assessed by immunoblotting. The characteristics of Vg that we identified in corals were somewhat similar to those of Vg in bilaterian oviparous animals, raising the hypothesis that such characteristics were likely present in the oogenesis of some common ancestor prior to divergence of the cnidarian and bilaterian lineages. (*Endocrinology* 154: 3447–3459, 2013)