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The development of task performance across the worker lifespan

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The developmental approach to studying division of labor has yielded considerable insight into endocrine, neural, and gene regulatory mechanisms that underlie worker task performance. Spurred by Wilson's description of temporal polyethism in *Pheidole dentata*, much of this work in ants and other social hymenopterans has focused on age-related developmental events that occur relatively soon after adult eclosion. Our recent efforts integrate physiological, neurobiological, behavioral, and comparative evolutionary analyses of division of labor in ants. I will discuss the relative contributions of canalized and experience-dependent physiological development to worker labor patterns; the use of antennal ablations, social manipulations, and efficiency measurements to test the importance of early-life sensory experience for worker behavioral and neural development; how aging workers continue to develop (and whether they senesce) throughout their adult lifespan; and how similar physiological and neurobiological mechanisms may regulate the behavioral differentiation of workers from different subcastes and species. Variation in worker larval and pupal developmental rates may be correlated with species ecology and impact adult task performance patterns, providing novel insight into the factors that affect worker task capabilities early in adult life. We emphasize the challenges of identifying the proximate mechanisms of division of labor in the context of the social and ecological factors that select for behavioral complexity.