What can a solitary bee tell us about the evolution of reproductive constraint in honeybees?

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The defining feature of eusociality is arguably the reproductive division of labour. In the honeybee, *Apis mellifera*, this division is achieved during development; future-queens are fed royal jelly and as a result they develop fully functional ovaries and a spermatheca. Workers, fed worker-jelly, have small ovaries that are kept in an inactive state in adults through queen mandibular pheromone (QMP) and brood pheromone. QMP acts via a conserved cell signalling pathway, Notch signalling, to keep worker ovaries in that quiescent state. While an egg laying queen is present, workers will remain reproductively constrained, and this maintains social harmony within the colony. Identifying how these molecular pathways were co-opted into the control of reproductive constraint is pivotal to answering questions regarding how eusociality evolved. To address this question we are using a combination of techniques to examine the function of genes and mechanisms, known to control reproduction in the honeybee (such as Notch signalling) in the related, solitary, Megachilid bee *Osmia bicornis*. This approach will allow us to determine if control of reproduction in honeybees has required de novo recruitment of genes or signalling pathways to new roles in the ovary, or if reproductive potential and control have evolved by tweaking of existing, perhaps environmentally responsive, control of reproduction.