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Gene expression analysis of somatic maintenance in ants.

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The theory of somatic maintenance argues that a trade-off exists between longevity and reproduction, and therefore that long-lived phenotypes will be those that invest more into escaping mortality and senescence. Ants are typically characterised by a massive natural variation in lifespan between castes, with queens living as much as 15 times longer than workers while being genetically identical. Furthermore, ant queens are amongst the longest living insects, with queens of the ant *Lasius niger* living for as long as 29 years in laboratory conditions. The challenge is therefore to identify the key features of queen physiology and life history that underlie this drastic difference in aging. We address the theory of somatic maintenance by asking whether queens invest more heavily than workers into molecular systems of maintenance such as DNA repair, using tissue-specific high-throughput sequencing of age-controlled individuals of each caste. We found that 2-month-old queens do indeed have higher expression of maintenance genes than workers of the same age, but that this difference does not exist between 1-day-old queens and workers. Queens therefore appear to be investing more into maintaining their soma, but do not do so consistently across all life stages.