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When it comes to water, snake foetuses have priority over mom

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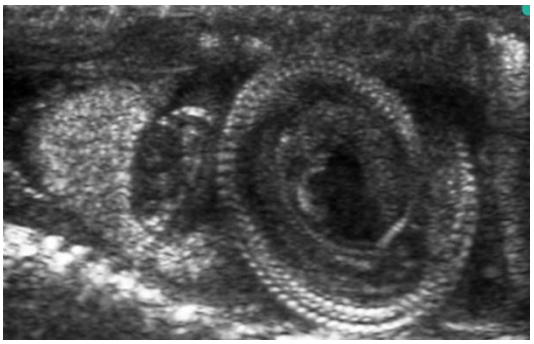
Conflicts between a parent and offspring are not unique to humans and may occur in nature whenever there is a limited resource that the two must share. Typically, energy has been the focus of such conflicts, but water is another vital resource that has yet to be considered in the framework of parent-offspring trade-offs or conflicts. In many dry environments, water can be quite limited during certain seasons and such times often coincide with pregnancy. However, physiological demands of pregnancy mean females require a greater amount of water during this period compared to times when the female is not pregnant. Since female snakes supply energy to their developing offspring in the form of yolk that is allocated prior to fertilization, using snakes as study organisms enabled us to examine possible intergenerational water conflicts independent of energy conflicts.

We explored the trade-off over water resources between a mother and her developing embryos in a live-bearing snake, the aspic viper. We manipulated water availability (control vs. water-deprived for 20 days) to pregnant and non-reproductive female snakes. Snakes can tolerate considerable levels of dehydration and thus our treatment was ecologically relevant and non-threatening to the general health of the snakes. We examined the effects of water deprivation on female water balance, water transfer to the embryos, and reproductive performance.



Ultrasonographic picture of a developing embryo (Vipera aspis)

Water deprivation resulted in significant female dehydration, with more pronounced effects in pregnant compared to non-reproductive females. The impacts of water deprivation on water balance were correlated with the number of offspring, with the most fecund females being more dehydrated. In contrast, water deprivation had no effect on water transfer to the offspring or on reproductive performance. Our results demonstrate that, when water is unavailable, female water balance is compromised in favour of the developing embryos, highlighting a significant trade-off over water resource between a mother and her offspring. Whether the prioritization of the offspring is a result of a "generous" mother preferentially allocating resources to her offspring or the offspring "selfishly" taking the water from the mother remains unknown. Regardless, this work demonstrates that parent-offspring conflict over water may be a substantial hurdle during the evolution of the live-bearing reproductive mode.