

Lecture Three

## BEYOND REPRODUCTION: RE-CONCEPTUALIZING OVARIES AND HEALTHY LONGEVITY

David J. Waters, DVM, PhD

**Objectives:** To understand the association between timing of spaying and healthy longevity in pet dogs and to examine evidence that supports a new line of thinking: Ovaries are part of a system that promotes longevity

**Summary:** Conventional wisdom says spaying (ovariohysterectomy) promotes health. However, recent evidence from 3 different species — dog, human, mouse — points to a potentially contradictory conclusion: Ovaries are part of a system that promotes healthy longevity. This lecture will take a look at this experimental evidence, encouraging a systems thinking approach that lends fresh perspective to the timing-of-spaying debate.

### References

1. Waters DJ, et al. Exploring mechanisms of sex differences in longevity: lifetime ovary exposure and exceptional longevity in dogs. *Aging Cell* 2009; 8: 752-755.
2. Waters DJ, et al. Probing the perils of dichotomous binning: how categorizing female dogs as spayed or intact can misinform our assumptions about the lifelong health consequences of ovariohysterectomy. *Theriogenology* 2011; 76: 1496-1500.
3. Waters DJ. In search of a strategic disturbance: some thoughts on the timing of spaying. *Clin Theriogenol* 2011; 3: 433-437.
4. Kengeri SS, et al. Exceptional longevity in female Rottweiler dogs is not encumbered by investment in reproduction. *AGE* 2013; 35: 2503-2513.
5. Parker WH, et al. Ovarian conservation at the time of hysterectomy and long-term health outcomes in the Nurses' Health Study. *Obstet. Gynecol.* 2009; 113: 1027-1037.
6. Cargill SL, et al. Age of ovary determines remaining life expectancy in old ovariectomized mice. *Aging Cell* 2003; 2: 185-190.
7. Yonker JA, et al. Hypothalamic-pituitary-gonadal axis homeostasis predicts longevity. *AGE* 2013; 35: 129-138.
8. Rocca WA, et al. Long-term effects of bilateral oophorectomy on brain aging: Unanswered questions from the Mayo Clinic Cohort Study of Oophorectomy and Aging. *Women's Health* 2009; 5: 39-48.