

7. THE AVIAN EPIDIDYMIS: A MODEL TO STUDY EPIDIDYMAL FUNCTION?

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It is proposed that the Japanese quail is a good model animal for studying the mechanism of post-testicular sperm maturation as the process is simple in the quail, only involving the development of motility during exposure for less than a day to secretions of the undifferentiated ductus epididymidis. By comparison, sperm maturation in mammals involves changes to numerous parameters during exposure, for a week or more, to secretions of the highly differentiated ductus epididymidis. We report our findings on epididymal function in the Japanese quail and compare them to reports on the Wistar rat. Although fluid output by the testis of the quail is about 4 times greater than the rat, fluid reabsorption by the efferent ducts is 8 times greater in the quail than rat so that sperm entering the ductus epididymidis are more concentrated in the quail than rat. Fluid reabsorption of the major ions by the ductuli is essentially isosmotic for both species. There is a slight deviation from this in the quail for K^+ , glutamate and glutamine (which increase in luminal concentration) and Ca^{2+} and Mg^{2+} (which decrease in luminal concentration). Most of the protein entering the ductuli is reabsorbed in the quail and rat. Fluid reabsorption in the ductus epididymidis is low in the quail and rat. In the quail, it is accompanied by little change in concentration of inorganic electrolytes which account for most (74%) of the osmotic pressure in the fluid, and the ratio of Na:K in the distal ductus is 5.3. However, in the rat the concentration of inorganic electrolytes is reduced substantially to only account for 29% of the osmotic pressure in the fluid, and the ratio of Na:K in the distal ductus is 0.9. Numerous proteins are present in the luminal fluid of the ductus epididymidis of the quail. However, unlike in the rat, the testis is the source of all major proteins except one. This, QEP16, is an unknown protein with a M_r of 16,000, and its secretion is androgen dependent. We are identifying it and determining its role in sperm maturation.