Extrarenal Secretion by Avian and Reptilian Salt Glands

Salt glands have been described in many species of birds and reptiles, including nearly all marine birds, ostriches, marine iguanas, sea snakes, sea turtles, crocodilians, and many terrestrial reptiles. In general, these animals are subjected to the osmotic stress of a marine or desert environment.

The salt glands of some reptiles and birds occupy shallow depressions in the skull above the eye. These glands consist of many lobes, each of which drains via branching secretory tubules, and a central canal into a collecting duct that empties into the nostril. Active secretion takes place across the epithelial cells of the secretory tubules. These cells have a large surface area and many mitochondria. As in other transport epithelia, tight junctions hold adjacent cells together, which prevents the massive leakage of water or solutes past the cells, from one side of the epithelium to another.

The avian salt gland is a countercurrent system that concentrates the secreted salt solution. The capillaries are arranged so that the flow of blood is in the direction opposite to the flow of secretory fluid. This flow maintains a minimum concentration gradient between blood and the tubular lumen along the entire length of the tubule.