148. *Effect of Prolactin on Water and Electrolyte Movements in the Isolated Urinary Bladder of the Flounder,* Kareius bicoloratus. T. Hirano, Ocean Research Institute, University of Tokyo, Tokyo, Japan.

When bladders were incubated on both mucosal and serosal sides with identical Ringer solution, water reabsorption from mucosa to serosa was greater in seawater-adapted (SW) fish that in freshwater-adapted (FW) fish, whereas Na^+ and Cl^- reabsorption from bladders of FW fish was noticeably greater. Prolactin treatment of SW fish caused the bladders to behave as if they were from FW fish. Concentration of Na^+ and Cl^- in the passing fluid were hypertonic to the Ringer by 5–7 times in FW and prolactin-treated SW fish, whereas those in SW fish were only slightly hypertonic. In all cases, almost identical amounts of Na^+ and Cl^- were transferred from mucosa to serosa, and transepithelial potential was nearly zero. Flounder bladders were almost impermeable to K^+, Mg^{2+}, and Ca^{2+}. The net absorption of Na^+ and water was completely inhibited by ouabain, suggesting that water absorption is linked to active transport of Na^+. In the flounder bladder, prolactin seems to decrease permeability to water while stimulating the neutral ion pump, thus favoring freshwater adaptation.

149. *The Effects of Prolactin on the Kidney Cells of the Stickleback* Gasterosteus aculeatus *after Transfer from the Sea to Fresh Water, Studied by Ultrathin Sectioning and Freeze-Etching.* S. E. Wendelaar Bonga and M. Veenhuis, Zoological Laboratory, University of Groningen, Haren, The Netherlands.

Three-spined sticklebacks (form *trachurus*) migrate in the spring from the sea to fresh water and return in autumn. Migration to fresh water implies for the kidney tubules a change from a modest secretion of mainly divalent ions to an intense reabsorption of mainly monovalent ions. This change is facilitated by prolactin. Morphometrical analysis, with cell height, nuclear, and mitochondrial volumes, and the extent of the basal labyrinth (the membrane system containing ion transport mechanisms) as parameters, showed that kidney cells are better developed in freshwater than in seawater fishes. After transfer of seawater fishes to fresh water, the parameters reached freshwater levels in 6–9 days. When ovine prolactin was injected daily, similar levels were obtained within 3 days. The cells of the second proximal tubules were studied by freeze-etching. Fracture faces and surfaces of the outer cell membranes and the membranes of the labyrinth were densely covered by small particles. Counts showed that the density of these particles was constant for each membrane face in a given physiological condition. Numbers found in freshwater fishes are significantly higher than in seawater specimens. After transfer into fresh water, the particle density of seawater fishes reached freshwater levels in about 24 hr. After prolactin injection the rate of increase was accelerated, indicating that part of the particles may be involved in prolactin controlled transport processes.

150. *Comparative Aspects of the Renin Angiotensin System of Amphibian and Mammalian Species.* Günter Grill and Herbert Dahlheim, University of Munich, Department of Physiology, Munich, West Germany.

During our investigation of the phylogenetic development of renin angiotensin systems in different species, we studied the reaction kinetic behavior of amphibian and mammalian angiotensin formation. Frog angiotensinogen was precipitated by $(NH_4)_2SO_4$ fractionation (200–280 g/l) and purified further by Sephadex gel filtration using G-75. Thus, a specific frog renin substrate concentration of 120 ng angiotensin equivalents per milligram protein could be measured. The purification characteristics of frog angiotensinogen were comparable to those of mammalian substrates prepared by the same methods. Frog renin substrate incubated with homologous renin (prepared according to the method of E. Hass *et al.*) produced angiotensin I, which was identified by radioimmunoassay. pH-optimum (6.4) and ionic strength behavior of frog angiotensin formation corresponded to those of mammals. The