

Histogenesis of the Stomach of Pre-Hatching Quail: A Light and Electron Microscopic Study

Authors : Soha A Soliman, Yasser A Ahmed, Mohamed A Khalaf

Abstract : Although the enormous literature describing the histology of the stomach of different avian species during the posthatching development, the available literature on the pre-hatching development of quail stomach development is scanty. Thus, the current study was undertaken to provide a careful description of the main histological events during the embryonic development of quail stomach. To achieve this aim, daily histological specimens from the stomach of quail of 4 days post-incubation till the day 17 (few hours before hatching) were examined with light microscopy. The current study showed that the primitive gut tube of the embryonic quail appeared at the 4th day post incubation, and both parts of stomach (proventriculus and gizzard) were similar in structure and composed of endodermal epithelium of pseudostratified type surrounded by undifferentiated mesenchymal tissue. The sequences of the developmental events in the gut tube were preceded in a cranio-caudal pattern. By the 5th day, the endodermal covering of the primitive proventriculus gave rise to sac-like invaginations. The primitive gizzard was distinguished into thick-walled bodies and thin-walled sacs. In the 6th day, the prospective proventricular glandular epithelium became canalized and the muscular layer was developed in the cranial part of the proventriculus, whereas the primitive muscular coat of the gizzard was represented by a layer of condensed mesenchyme. In the 7th day, the proventricular glandular epithelial invaginations increased in depth and number, while, the muscularis mucosa and the muscular layer began to be distinguished. In the 8th day, the myoblasts differentiated into spindle shaped smooth muscle fibers. In the 10th day, branching of the proventricular glands began. The branching continued later on. The surface and the glandular epithelium were transformed into simple columnar type in the 12th day. The epithelial covering of the gizzard gave rise to tubular invaginations lined by simple cuboidal epithelium and the surface epithelium became simple columnar. Canalization of the tubular glands was recognized in the 14th day. In the 15th day, the proventricular surface epithelium invaginated in an concentric manner around a central cavity to form immature secretory units. The central cavity was lined by eosinophilic cells which form the ductal epithelia. The peripheral lamellae were lined by basophilic cells; the undifferentiated oxyntico-peptic cells. Entero-endocrine cells stained positive for silver impregnation in the proventricular glands. The mucosal folding in the gizzard appeared in the 15th day to form the plicae and the sulci. The wall of the proventriculus and gizzard in the 17th day acquired the main histological features of post-hatching birds, but neither the surface nor the ductal epithelium were differentiated to mucous producing cells. The current results shoed be considered in the molecular developmental studies.

Keywords : quail, proventriculus, gizzard, pre-hatching, histology

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