Transfer of egg white proteins with reference to lysozyme during the development of Meleagris gallopavo (Galliformes: Phasianidae) embryos

S. J. SHBAILAT* & H. M. SAFI
Department of Biology and Biotechnology, The Hashemite University, Zarqa, Jordan

The egg white and egg yolk are the two main sources of nutrients for the developing avian embryo. The egg white should be transferred into the yolk in order to be consumed by the embryo. How the egg white ultimately reaches the egg yolk is largely unexplored in the turkey Meleagris gallopavo. Here, we explored the routes of egg white transfer in fertilized turkey eggs. Initially, we tested the electrophoretic pattern of the proteins in different egg compartments throughout development. Then, we used lysozyme as a reference protein to follow the egg white transfer, and we measured its activity using Micrococcus lysodeikticus as a substrate. We found that several presumptive egg white protein bands appeared in the different egg compartments. Also, the electrophoretic patterns in the intestinal fluid and thick yolk were marked by the disappearance of large bands and the appearance of small ones at late developmental stages. Moreover, we detected a chronological appearance of lysozyme activity in the different egg compartments. The activity appeared in the extraembryonic and amniotic fluids on day 15, in the intestinal fluid on day 16 and in the thick yolk on day 17, and it increased in general with the progress of development. Our results suggest that the main route of egg white transfer is albumen sac – extraembryonic cavity – amniotic cavity – intestinal lumen – egg yolk. Furthermore, the transferred egg white proteins seem to undergo digestion in the intestinal lumen and egg yolk at late developmental stages.