A COMPARISON OF DNASE ACTIVITIES IN AVIAN AND MAMMALIAN OOCYTES

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During polyspermic fertilization in birds, numerous sperm penetrate the egg. This contrasts with the situation in mammals, where fertilization is monospermic. However, in birds, only one of the sperm entering an egg participates in the formation of a zygote nucleus, while the supernumerary sperm degenerate during the early cleavage stages. Our previous work on preovulatory quail oocytes showed the presence of DNase I and II activities able to digest naked λDNA/*Hind*III *in vitro*. In this study, the activities of both DNases in quail oocytes at different stages of oogenesis and in mouse ovulated oocytes were assayed *in vitro* using the same substrate. The degradation of quail sperm by extracts from preovulatory quail oocytes was also checked. The digestion of the DNA substrate was evaluated by agarose gel electrophoresis. The activities of DNase I and II in quail oocytes increased during oogenesis and were the highest in the germinal discs of preovulatory and ovulated oocytes. In ovulated oocytes, the DNase activities were present not only in germinal discs but also in a thin layer of cytoplasm adhering to the perivitelline layer; no DNase activities were found in the yolk. At all the stages of oogenesis, the activity of DNase II was much higher than that of DNase I. The use of quail sperm as a substrate showed that DNases from quail oocytes are able to digest not only naked DNA, but also the DNA contained in the sperm. In contrast to what is observed in quail oocytes, no DNase activities were detected in ovulated mouse oocytes; this is logical as they would be useless or even harmful in monospermic fertilization. The presence of high DNase activities in quail oocytes would point to their role in the degradation of DNA from supernumerary sperm entering the avian ovum during polyspermic fertilization.