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The Chick Egg and Visualisations of Microscopy Slides of Cross-Sections of Chick Embryo during 4 Stages of Development

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ABSTRACT

This research note is on the chick egg and an examination of the presence of structures in cross-sections of chick embryos during 4 stages of development. In a previous repot, the structures in whole mounts had been discussed. Although similarities exist between whole mounts and cross-sectioned examined glass slides, there are major differences when cross-sections are examined. This paper highlights the main structures seen using light microscopy.

KEYWORDS: blastodisc, discoidal, yolk, cleavage pattern, neural groove, brain structures

In the chick egg, the central region which controls the development is called the nucleus. In the chick egg, this nucleus is called the blastodisc. The egg itself is said to be amniotic because the embryos are protected from desiccation by means of the amnion (UKZN, 2019). The basic structure of a chicken egg encompasses at least 10 regions. These regions are the shell, a region through which the embryo obtains oxygen, the yolk, a region through which the embryo receives its nutrients from. The other eight regions are the inner and outer shell membranes, the chalaza, which and thin albumin, the germinal disk, yolk membrane, as well as the air cell (Singh, 2019). An alternative name given for the germinal disc is the blastodisc; and this region is of at most importance during chick development because this region gives rise to the endoderm, ectoderm and the mesoderm (Watt *et al*., 1993). Fertilisation occurs in the infundibulum or oviduct and the chicken embryo cleaves incompletely at the blastodisc. Therefore, the cleavage pattern is called discoidal meroblastic. The 3 layers mentioned are regulated by means of the Hensen's node, which sorts the 3 germ layers, the axis formation as well as it acts as a chick organiser (Sellier *et al*., 2006). Glass microscopy slides of cross-sections of chick embryos at 18 hours, 24 hours, 33-40 hours as well as 48 hours, show similar structures as those viewed using whole mounts. In the *18 hour embryo*, the primitive streak is visible and this gives rise to the structures required during gastrulation. Also evident is the area opaca and area pellicida (Singh, 2019). At this stage of development, the migrating cells give rise to the mesoderm and endoderm. The midgut is formed due to the primitive streak which is covered by the ectoderm (Singh, 2019). In the *24 hour embryo*, a structure evident is the notochord, which will eventually give rise to the spinal cord of the chicken (Singh, 2019; UKZN, 2019). Also evident are the somites and neural groove. In addition, the body mesoderm as well as the aplanchnopleure are evident. This indicates the development of the nervous system. In the *33-40 hour embryo* cross-sections through the head, heart and trunk reveal different structures. In the head, the mesoderm, endoderm and epidermis are clearly seen (Singh, 2019). In addition, the egg structures and brain region are shown to be developing. The two regions on glass slides that reveal egg and brain features are the optic vesicle and proencephalon. For the heart and trunk region, the notochord, endocardium and mid-gut are well developed (UKZN, 2019). In addition, the ventral aortic root and dorsal aorta are visible. Furthermore, the vitelline veins and

lateral body folds are visible. The neural crest, which is above the notochord is also visible (Singh, 2019). In the *48 hour embryo*, just like in the whole mount slides, all the brain structures are developed, as well as the heart, spinal cord and heart (Singh, 2019; Watt *et al*., 2019). The 3 brain regions that are visible is the mesencephalon, diencephalon and telencephalon (Singh, 2019). In addition to these are the mesencephalon and metencephalon (Singh, 2019). The sagittal section of the chick embryo is better understood, since the structure resembles the developing embryo (Singh, 2019). The in-depth details have been discussed in a previous report by the author.

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