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Popular Article

Chorioallantois membrane of Indigenous of fowl of Assam and its importance

Anil Deka

Assistant Professor, Department of Anatomy & Histology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India.

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Abstract

The Chorioallantois Membrane is a extensively vascularized membrane found in the eggs of certain amniotes viz., birds and reptiles which one is homologues to the mammalian placenta. It is highly utilized in research due to immunodeficient and extensive vascularization. It was formed by the fusion of chorion and allantois.

Introduction

The Chorioallantois Membrane is a extensively vascularized membrane found in the eggs of certain amniotes viz., birds and reptiles. It is formed by the fusion of the mesodermal layers of two extra-embryonic membranes – the chorion and the allantois (Gilbert,2003). It is homologues to the mammalian placenta. It is the outermost extra-embryonic membrane and covered by the non-vascular egg shell membrane.

Function of Chorioallantois membrane

It acts as a respiratory organ for the developing embryo. It transports the calcium ion from the egg shell for ossification of the bone of the developing embryo. The chorioallantois membrane maintain the acid base homeostasis of the developing embryo. It also helps in absorption of water and electrolytes like sodium and chloride from the allantois cavity, and also act as a barrier against the toxins and waste stored inside the allantois cavity (Gabriella and Accili,2010).

Utility of CAM tissue

1. It is an excellent platform for testing multiple drug delivery system which are design to distribute medical substance to specific sites of disease or wounds.
2. It can be used as a biosensor due more amount vascular structure.



3. Due to vessels permeability provides an important feature to study the pharmacokinetics of drugs diffusion through the CAM vasculature.
4. It can be utilized as a model assay to study and evaluate allogenic and xenogenic transplantation of different tissue and organs.
5. The activity or toxicity of a drug can be evaluated in the CAM.
6. For testing of Pro-angiogenic agents.
7. CAM can be used as anti-Angiogenic agents.
8. The drugs of burn wounds and chronic cutaneous ulcers can study in CAM tissue.
9. The CAM is an excellent host to study cancer biology and tumour graft growth, because the immune system has not become competent and rejection has not been established until embryonic day 18.
10. CAM can practically host the growth of inoculation xenogenic tumour cells and tissue, which efficiently helps to stimulate and analyse metastases of human tumours.
11. The CAM has been used as a test platform for anti-angiogenic drugs to study the inhibition of angiogenesis of tumour growth, chemosensitivity towards tumour invasion and metastasis, inhibitory effects of chemotherapeutic drugs on metastatic foci and experimental radiation oncology research.
12. It can used in screening of drugs toxicity.
13. Apart from this utility of CAM tissue, ethical question is not arising because it is still not considered as animal.
14. It can used in bone remodelling.

Materials and Methods

The present study was conducted on 1 Embryonic Day (ED) to 17 Embryonic Day (ED). From each age group six number of hatching eggs were utilized. The eggs were brought to the Department of Anatomy & Histology, College of veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam and studied was done. For histological study, Chorioallantois membrane (CAM) was collected immediately after opening of the egg shell and membrane of the egg and kept in 10% NBF. The tissue sample were processed as per the standard methods of Luna (1968) for paraffin block. Paraffin blocks were cut in 5-micron thickness and stained with routine Haematoxylin and Eosin stain.



Results



Fig.1. Photograph showing the chorioallantois membrane (tip of the forceps) of Indigenous fowl

It was noticed that the chorioallantois membrane (Fig.1) start to develop on 3 ED. Partial Fusion of Chorion and allantois occurred between the 5ED and 6ED. 10ED, extensive development of capillary network followed by complete differentiation of chorioallantois membrane on 13ED. In histology section, it was observed that the upper most layer was chorion followed by mesoderm which contained cross section blood vessels and allantois (Fig.2).



Fig.2. Photo micrograph showing the Chorion (A), Mesoderm (B), blood vessels of mesoderm (C) and allantois (D) of chorioallantois membrane of Indigenous fowl of Assam.

HXE,10X

Conclusion

The chorioallantois membrane is important organ of many research like tumour, cancer biology, drug delivery, pharmacokinetics of drug etc. It is cost effective compared to rat or mouse.

There is no ethical issue because till now it is not considered as an animal. The details structure of CAM tissue, it will be beneficial to the cancer biologist and developmental biologist.

Reference

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