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Chemical Dissection of Zebrafish Egg Envelop, the Chorion

Hwang, C.N.¹, H.J. Kang², C. Kim², D.S. Na², S.K. Chae², B.K. Joo², J.W. Lee² and S.H. Lee¹

¹School of Life Sciences and Biotechnology, Korea University, Seoul 136-701

²Center of Microintelligent System, KIST, Seoul 136-791

The eggs of most animal species are surrounded by an extracellular matrix known as chorion, egg envelope, egg coat, or zona pellucida. Development of fish embryo usually takes several days in an aquatic environment. During embryonic development, the chorion must protect embryo from physical damage and microbial infection in the exposed aquatic environment. A few studies have been reported on the chorion of zebrafish embryo, demonstrating that choriogenin or zona proteins are synthesized from the liver precursor proteins of the chorion in medaka. In addition to the choriogenin, proteins from the secretory granules, called cortical granules present in the vicinity of the plasma membrane, are released and added to the coat upon fertilization. However, such study has been never been conducted in zebrafish. In the study, we tried to establish protein properties in both unfertilized and fertilized egg envelop, whether the components may be used as a biomaterial for cell matrix in certain device. To investigate the changes in carbohydrate components, chorions were obtained from fertilized and unfertilized zebra fish eggs and incubated with lectins (Con A, PHA-E, UEA-1 and WGA). Chorion lysates were also prepared from the eggs and separated on 10% SDS PAGE gel. PHA-E and UEA-1 binding sites were found to be present highly on fertilized chorion. PHA-E and UEA-1 binding sites were detected weakly in intact- and SDS-treated chorion of unfertilized embryos, but Con A and WGA binding sites were not detected in intact- and SDS-treated chorion of unfertilized embryos. After SDS treatment, about 120 kDa protein(s) diminished from fertilized chorion. Similar disappearance of 70kDa protein(s) was found in SDS-treated unfertilized chorion. Differences in morphology and chemical properties of both unfertilized and fertilized egg chorion suggest that zebrafish chorion can be dissolved to be utilized as a biomaterial, and that fertilization may lead to many chemical modifications as indicated by lectin binding sites and protein profiles. The results should provide important basis for chemical properties of the extracellular matrix of zebrafish egg.

Key words: *Chorion, Glycoprotein, Lectin binding, Fertilization and unfertilized chorion*