S24-5 Development of novel cell culture systems utilizing the advantages of collagen vitrigel membrane

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It is reported that the gel of heat-denatured proteins such as boiled egg whites can be converted into a hard and transparent glass-like material by gradually drying out not only the free water but also the bounding water contained therein. "Vitrigel" is a new technical term named by Takezawa *et al.* for the gel prepared via the vitrification technology of the heat-denatured proteins. Here, collagen vitrigel is prepared in three sequential steps. The first step is gelation, in which a traditional collagen gel is formed at physiological salt concentration, hydrogen-ion concentration and temperature. A vitrification step follows in which the traditional collagen gel is converted into a glass-like material, and finally a rehydration process adds water to the vitrified material. The collagen vitrigel membrane made of densely packed collagen fibrils twisted together like connective tissue *in vivo* forms a thin and transparent film with a thickness of ca. 20-50 micro-meters which possesses excellent protein-permeability and mechanical strength. In particular, the collagen vitrigel membrane with a nylon-ring support can be easily handled by tweezers, a feature which lends to its usefulness as a scaffold in various culture systems. Also, collagen vitrigels containing bioactive agents can function as sustained-release carriers and consequently can serve as drug-delivery systems (DDS). In this symposium, we introduce recent studies on culture systems of corneal cells for ocular irritancy and permeability tests, skin cells for sensitization tests, renal glomerular cells for plasma filtration models, endometrial cells for a novel infertility treatment, and DDS for hepatopathy.