

Life Without a Cell Membrane: Regeneration of
Protoplasts from Disintegrated Cells of the Marine Green
Alga *Bryopsis plumosa*

Gwang Hoon Kim^{1*}, Tatiana A. Klotchkova, and
Yoon-Mi Kang

Department of Biology, Kongju National University,
Kongjushi Chungnam 314-701

When injured, the protoplasm come out from the multi-nucleate giant cell of a green alga *Bryopsis plumosa* can generate numerous new cells spontaneously. The cell organelles aggregated rapidly in sea water and became covered with a gelatinous envelope within fifteen minutes. A lipid cell membrane was formed inside the envelope within nine to twelve hours. Cytochemical studies using Nile Red and various enzymes revealed that the primary envelope is initially composed of polysaccharides then becoming a polysaccharide-lipid complex. Fluorescein diacetate (FDA) staining showed that the primary envelope has some characteristics of cell membranes including semipermeability and selective transport of materials. The aggregation of cell organelles appears to be mediated by two kinds of material; one in vacuolar sap and the other on the surface of cell organelles. About a thousand new cells, were generated from a single disintegrated branch and forty percent of them eventually developed into mature plants.

Keywords: regeneration, protoplast, green algae, *Bryopsis*, cell membrane