

# A 3D-sponge cell culture to study the pre-requisites of the installation of a bacterial symbiosis

Gaël LE PENNEC

Laboratoire de Biotechnologie et de Chimie Marines, Université de Bretagne Sud-UEB, IUEM, BP92116, 56321-Lorient Cedex, France.

Corresponding author: gaël Le Penneec, [gael.le-pennec@univ-ubs.fr](mailto:gael.le-pennec@univ-ubs.fr)

**Keywords** : 3D-cell culture, Sponge, Symbiosis, Innate immunity, Apoptosis

Since 700 million years, sponges and bacteria co-evolve to form a symbiotic community sensu De Bary (1879). Nevertheless rare studies mention the interactions between partners although molecular communications may occur to maintain a balanced association. In particular, during the early stages of the symbiosis, when one has to be recognized by the other prior to its installation e.g. during the recruitment and selection steps of bacteria by the sponge, a cross-dialogue has to be set up. Molecules such as autoinducers may circulate to inform the sponge of the presence of bacteria and to be recognized as a potential symbiot or in defect considered as nutrient. To understand how the demosponge *Suberites domuncula* reacts face to bacteria we contaminated sponge cell cultures with different bacterial components: crude culture supernatants, N-Acyl homoserine lactones, alive bacteria, and membrane elements such as pure lipopolysaccharides. To achieve these experiments two bacteria previously isolated from *S. domuncula* were used: an opportunistic one which in particular cases may be pathogenic (*Pseudoalteromonas sp. 1A1*) and a commensal one (*Endozoicomonas sp. Hex311*) isolated on media supplemented with sponge extracts and which belongs to a genus already present in an other sponge, a coral and a mollusk. An axenic 3D-cell culture was used to determine how the sponge behaves towards those bacteria. Preliminary results pointed out the expression of apoptosis and immune markers which was different according to the fate of the bacterium. Mainly, no immune response was monitored with the commensal bacterium although immune and apoptotic pathways were triggered with the opportunistic one. This axenic 3D-cell culture model demonstrated its legitimacy in bacterial contamination studies to better understand how an eukaryotic cell faced to symbiotic bacteria.