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Ion transport in the outer mantle epithelium of bivalves. Mechanical studies using in vitro Ussing chamber techniques

All the shellfish shells are made mostly of calcium carbonate; therefore access to calcium is essential for these animals. Luckily they live in a marine environment where there is no shortage of it; however calcium must first be taken up and transported to the shell in order to be available for shell growth. My part of the CACHE project is to find out what these uptake and transport mechanisms are and how they are controlled.

I will focus on the outer mantle epithelium, which is the last tissue to separate the body of the animal from the growing shell, and where all transport of material for building the new shell will take place. Transport of calcium through this tissue can either happen in ionic state, bound to either small molecules or calcium-binding proteins, or be incorporated in hemolymph cells, hemocytes. I will look at both in which form calcium is transported, and what mechanisms this transport uses. I'll use for example a method called the Ussing chamber technique to study the transport mechanisms and barrier functions of a live mantle tissue. To know the basic transport mechanisms is important since this information can be used to find out how these might be affected by changing environmental conditions such as ocean acidification.

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