The Influence of Mechanotransduction (ESW) on the Reaction of Membrane Ion Channels by means of Patch Clump Technique

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Device and producing company:
Piezoson 100 and Piezowave (Richard Wolf GmbH, Knittlingen Germany)

Introduction:
Ion channels aqueous pores across the liquid bilayer and allow inorganic ions of appropriate size and charge to cross the membrane down their electrochemical gradients at rates about 1,000 times greater than those achieved by any known carrier. These channels are "gated" and usually open transiently in response to a specific pertuberation (ESW) in the membrane, such as a change in membrane potential (voltage gated channels) or the binding of a neurotransmitter (transmitter gated channels). Ion channels work together in complex ways to control the behavior of electrically excitable cells.

Methods:
Unlike traditional voltage clamp recordings, the patch clamp recording uses a single electrode to voltage clamp a cell. This allows the researcher to keep the voltage constant while observing changes in current. For our experiments we used rat muscles for patch clump measurement for a single voltage-gated Na+ channel after mechanical stress (ESW).

Results:
The best density of energy to open voltage-gated Na+-channels in the plasma membrane of muscle cells by a local depolarisation is between 0.04 and 0.22mJ/mm².

Discussion:
This experiments shows at the beginning of the influence of ESWT on living tissue we have the mechanotransduction with the change of mechanical energy to electric and chemical energy.

Conclusion:
For a good application of ESWT the knowledge of the physico-chemical pathways is very important.