

Single or Dual Channel Mechanisms

A further comment

Dear Sir:

I want to thank Drs. Narahashi and Moore for their reply to my comments. I agree that we cannot at present choose between single and dual channel models for

excitation. The purpose of this exchange is to stimulate the development of criteria for deciding between models for nerve excitation.

My main purpose in a further reply is to comment on the results of Cole and Moore (1960) cited above. Narahashi and Moore are quite correct in saying that these do not fit very well with my original proposal. This is so because a change in channel size was assumed to lead to both the g_{Na} *off* and g_K *on* processes. The important point of the Cole and Moore paper was to make abundantly clear that the Hodgkin-Huxley equations for g_K must be of the wrong form, as the results obtained required g_K to rise as $(1 - t/\tau)^{25}$.

It is a property of channels (or collections of sites), however, that for ions to pass, the pathway must be open at both ends; a plug at either end is sufficient to terminate ion flow. It is possible, then that strong hyperpolarization delays a relaxation process on one side of the membrane but not on the other. Such an effect would allow g_{Na} to terminate normally but would delay the onset of g_K .

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