ATTENUATION FUNCTION AS AN ALTERNATIVE TO HILL FUNCTION IN MODELING OF SIGNALING PATHWAYS

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ABSTRACT

Hill function is one of the most commonly used in modeling signaling pathways, allowing for sigmoid shaping of the process rate in the case of activation and repression. However, in many cases the experiments provide only indirect proof that some activator, or repressor, exists. The very molecule may be unknown, or its direct measurement may be difficult. If so, it is very difficult to determine the parameters of the Hill function, especially in the case of heterogeneous cellular responses to various stimuli. In this work we propose a simple procedure that allows to replace the repressor protein dynamics and the Hill function with an attenuation function. The proposed approach can be particularly useful in simplifying models that arise from combining signaling pathways characterized by one-directional crosstalk.

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