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A simplified mechano-chemical model of buffered calcium waves

We consider the coupling between chemical and mechanical effects governing the calcium dynamics in biological tissues. We perform some simplifications of equations describing these phenomena. Firstly, we assume that the buffering acts on a rapid time scale (J. Wagner, J. Keizer, *Biophys. J.*, 1994). Secondly, treating the tissue as a viscoelastic medium, we perform expansion of the balance-of-forces equation assuming either that the viscous effects are small compared to the elastic ones or that the elastic and viscous forces are weak compared to mechanical constraints resulting from reaction of the extracellular matrix (Z. Peradzyński, *Arch. Mech.*, 2010). We present one reaction-diffusion equation covering both types of approximation. To determine the traction we treat the free calcium ions, the buffered calcium and the calcium engaged in generating the traction as a sort of mixture and postulate the applicability of the Ficks first law of diffusion. As the result we obtain an expression for the traction and the coefficient of the diffusion. We look for the solutions of our model equation in the form of travelling waves. We give a recipe how to construct classes of explicit expressions for the calcium waves.