

Erythrocyte mediated force application (EMFA) by optical tweezers for studies of calcium signalling in cardiomyocytes and in fibroblasts

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Generally cells, when stimulated micromechanically, release calcium from internal pools into their cytoplasm.. Gentle force transmission is often not possible with micromechanical tools, and optical tweezers are too weak to start the waves. When erythrocytes are used as handles, the transmission of forces generated by optical tweezers is sufficient not only to gently start such a wave in a single cell. The wave couples to neighbouring cells and flows over a whole tissue. This effect is, not surprisingly, observed in layers of excitable cardiomyocytes, and, surprisingly, also in non -excitable fibroblast layers.