Re-elongation of axopodia after induction of rapid axopodial contraction in heliozoon *Raphidiophrys contractilis*

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SUMMARY

Heliozoons have numerous stiff and radiating axopodia, each containing a bundle of axonemal microtubules as a cytoskeleton. For this study, we investigated the axopodial re-elongation process in the centrohelid heliozoon *Raphidiophrys contractilis* and in the actinophryid heliozoon *Actinophrys sol* after induction of rapid axopodial contraction evoked by mechanical or electrical stimulation. Changes in the length of axopodia were analyzed using video microscopy at a frame rate of 30 Hz. The re-elongation velocity of an axopodium was defined as the maximal velocity estimated during the first 1 min after induction of axopodial contraction. The estimated velocity showed a 25-fold difference between *R. contractilis* (3.8 ± 0.18 μm/s) and *A. sol* (0.15 ± 0.04 μm/s). The elongation velocity in *A. sol* was in the reported range of elongation speeds of microtubules in animal and plant cells, both in vivo and in vitro. These results suggest that the mechanism of axopodial elongation in *R. contractilis* differs from that in *A. sol*, and that a novel mechanism in microtubule assembly might be involved in the axopodial elongation process in *R. contractilis*.