Characterization of a novel filament system in goldfish xanthophores

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摘要

Abstract

We report the presence of a novel filament system in goldfish xanthophores using a monoclonal antibody (A2) made against 40-70 kD proteins derived from cytoskeletal preparations. On Western blots, this antibody recognized a 45 kD protein in xanthophore cell extracts. In cells with dispersed pigment, immunofluorescence staining of xanthophores revealed a uniform distribution of A2-reactive filaments. In cells with aggregated pigment, these filaments assumed a distinctively radial orientation, such that filaments emanated from the central pigment mass (CPM). At the electron microscopic level, immunogold labeling identified a filament system with a diameter of 7 nm. Overall, the cellular distribution of A2-reactive filaments was distinctly different from that of the other known components of the cytoskeleton, such as intermediate filaments, actin filaments, and microtubules. A2-reactive filaments also appeared resistant to agents known to perturb the cytoskeleton such as cytochalasin B, which depolymerized the actin filaments. When xanthophores were treated with vinblastine, shown to depolymerize microtubules and induce the collapse of intermediate filaments (vimentin and keratin) in other cell types, no effect on the A2 filament distribution was observed. On the other hand, treatment with calyculin A, a phosphatase inhibitor, converted A2 filaments into a wavy bundles, the effect of which was completely reversible by the removal of the drug from culture medium. These novel properties of A2 filaments, together with their reorganization in response to pigment translocation suggest that A2 filaments might play a yet unidentified role in intracellular organelle transport in these cells.