THE ROLE OF ACTOMYOSIN CYTOSKELETON IN THE MOVEMENT OF LICHEN PHOTOBIONT CELLS TOWARDS A COMPATIBLE, LECTIN-PRODUCING MYCOBIONT.

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Algal and cyanobacterial cell motility is at the base of the chemotactic movement of lichen photobionts towards a mycobiont producing a concentration gradient of specific recognition lectins. The absence of surface elements related to cell movement in phyco- and cyanobionts, and the appearance of cells that present a concavity during or after movement, verified by scanning electron microscopy, supports the hypothesis that the motility of these cells could develop as contraction-relaxation episodes of the actomyosyn cytoskeleton, induced by the fungal lectin that acts as a chemo-attractant. This movement does not involve a MereB protein in cyanobionts, since it is not inhibited by S-(3,4-dichlorobenzyl)isothiourea, A22, but a true actin since cellular motility is inhibited by phalloidin and latruncillin A and an associated type II myosin, whose activity, and therefore cellular motility, is inhibited by blebistatin.

In our laboratory, we have found evidences about the existence of actin- and myosin-like proteins in lichen photobionts using antibodies reactive against α- and β-actin and others against the light and heavy chains of non-muscular myosin II. Anti-actin antibodies bind to a single reactive polypeptide, of a molecular mass of 50 kD and pI values between 4 and 7, similar to eukaryotic actin. The light chain anti-myosin antibody reacts with a 20 kDa molecular mass protein and a 48 kDa protein. Immunoprecipitation of free photobiont extracts using the anti-myosin heavy chain antibody produces a single signal corresponding to a 200 kDa molecular mass protein. The inhibition of chemotaxis produced by the combined action of phalloidin and blebistatin is reversed to a large extent by GTP and its analogs GTP(γ)S and GDP(β)S, as well as by cyclic AMP. The movement then involves a reorganization of the cytoskeleton that causes cell polarity, inhibited in turn by phalloidin and latrunculin A.