Cell Motility

Keelan Krinsky: 1634953

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The importance of cell motility, and the associated molecular machinery, in mature human cells is best understood through the lens of its origin and evolution. In eukaryotic cells the molecular system of motility, although extremely adaptive in its phenotypic expression, consist of a limited number of constituents encoded by a highly conserved set of genes. (Cappuccinelli P, 1980). These key constituents, namely dyenin ATPase motor proteins, and microtubules, originated from and in fact still integrate closely with, another important cellular system, the cytoskeleton.Just as the components of the cellular motility form a natural extension of the cytoplasm so does its function. While the cytoskeleton acts to maintain homeostasis by regulating transport in the internal internal cellular environment (Fletcher and Mullins, 2010), The motility system maintains homeostasis by regulating the cells external environment, i.e by moving to different external environments.

The evolutionary advantage provided by the loose form of environmental regulation afforded by cellular motility is perhaps most apparent in the context of single cellular organism. Protists rely heavily on their motility and associated chemo-taxis pathways to attain their food source,either in actively seeking out high nutrient environments, (Fenchel and Blackburn, 1999), or in the chase of prokaryotes prey species, in direct predation. (Pernthaler, 2005). Additionally, motility is also central in evading damage from toxins within the environment, (Ermilova *et al*, 2007), and predation (Jakobsen, 2001). Overall, motility in protists is clearly a highly evolutionary positive trait, with no obvious disadvantages.

The advantages motility conferred to single cellular Eukaryotas serve well to explain the original presence of cellular motility in early multicellular eukaryotes, and such it could be argued that the retention of motility structures in human cells are merely the remnants of an historically advantageous system. However by itself this explainatioin is woefully insufficent, becuase it misses the many distinct evolution disadvatages, and advatages which motility confers to multicellular organisms. For example cellular motility is absolutely essentially in effective tissue repair, (Rosen and Goldberg, 1989), but are also active in thedevelopment and progression of cancers (Condeelis,2005)

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The cells making up most adult human tissues are essentially non-motile but nevertheless retain the molecular basis to eukaryotic cellular motility. This feature has both positive (reconstructive) and negative (invasion and metastasis) value. Develop an argument for the retention of such a molecular system given the obvious risks to the organism. Your argument must be supported by appropriate evidence and should be presented in no more than 2 typed pages.