**Chapter 14 The Cytoskeleton and Cell Movement**

**14.1 Structure and Organization of Actin Filaments**

Baines, A. J., H.-C. Lu and P. M. Bennett 2013. The protein 4.1 family: hub proteins in animals for organizing membrane proteins. *Biochim. Biophys. Acta* 1838: 605-619. [R]

Bravo-Cordero, J. J., M. A. O. Magalhaes, R. J. Eddy, L. Hodgson and J. Condeelis. 2013. Functions of cofilin in cell locomotion and invasion. *Nature Rev. Mol. Cell Biol.* 14: 405-415. [R]

Breitsprecher, D. and B. L. Goode. 2013. Formins at a glance. *J. Cell Sci.* 126: 1-7. [R]

Campellone, K. G. and M. D. Welch. 2010. A nucleator arms race: cellular control of actin assembly. *Nature Rev. Mol. Cell Biol.* 11: 237–251. [R]

Carlier, M.-F. and S. Shekhar. 2017. Global treadmilling coordinates actin turnover and controls the size of actin networks. *Nature Rev. Mol. Cell Biol.* 18: 389-401. [R]

Dominguez, R. and K. C. Holmes. 2011. Actin structure and function. *Ann. Rev. Biophys.* 40: 169–186. [R]

Fehon, R. G., A. I. McClatchey and A. Bretscher. 2010. Organizing the cell cortex: the role of ERM proteins. *Nature Rev. Mol. Cell Biol.* 11: 276–287. [R]

Kabsch, W., H. G. Mannherz, D. Suck, E. F. Pai and K. C. Holmes. 1990. Atomic structure of the actin: DNase I complex. *Nature* 347: 37–44. [P]

Ozyamak, E., J. M. Kollman and A. Komeili. 2013. Bacterial actins and their diversity. *Biochemistry* 52: 6928-6939. [R]

Pollard, T. D. and J. A. Cooper. 2009. Actin, a central player in cell shape and movement. *Science* 326: 1208–1212. [R]

Rahimov, F. and L. M. Kunkcl. 2013. Cellular and molecular mechanisms underlying muscular dystrophy. *J. Cell Biol.* 201: 499–510. [R]

Rotty, J. D., C. Wu and J. E. Bear. 2013. New insights into the regulation and cellular functions of the ARP2/3 complex. *Nature Rev. Mol. Cell Biol.* 14: 7–12. [R]

Siton-Mendelson, O. and A. Bernheim-Groswasser. 2017. Functional actin networks under construction: the cooperative action of actin nucleation and elongation factors. *Trends Biochem. Sci.* 42: 414-430. [R]

Zhou, A. X., J. H. Hartwig and L. M. Akyurek. 2010. Filamins in cell signaling, transcription and organ development. *Trends Cell Biol.* 20: 113–123. [R]

**14.2 Myosin Motors**

Finer, J. T., R. M. Simmons and J. A. Spudich. 1994. Single myosin molecule mechanics: Piconewton forces and nanometre steps. *Nature* 368: 113–119. [P]

Geeves, M. A. and K. C. Holmes. 1999. Structural mechanism of muscle contraction. *Ann. Rev. Biochem*. 68: 687–728. [R]

Greenberg, M. J. and E. M. Ostap. 2013. Regulation and control of myosin-I by the motor and light chain binding domains. *Trends Cell Biol.* 23: 81–89. [R]

Hammer, J. A. III and W. Wagner. 2013. Functions of class V myosins in neurons. *J. Biol. Chem.* 288: 28428–28434. [R]

Huxley, A. F. and R. Niedergerke. 1954. Interference microscopy of living muscle fibres. *Nature* 173: 971–973. [P]

Huxley, H. E. 1969. The mechanism of muscle contraction. *Science* 164: 1356–1366. [R]

Huxley, H. E. and J. Hanson. 1954. Changes in the cross-striations of muscle contraction and their structural interpretation. *Nature* 173: 973–976. [P]

Rayment, I., H. M. Holden, M. Whittaker, C. B. Yohn, M. Lorenz, K. C. Kolmes and R. A. Milligan. 1993. Structure of the actin-myosin complex and its implications for muscle contraction. *Science* 261: 58–65. [P]

Rayment, I., W. R. Rypniewski, K. Schmidt- Base, R. Smith, D. R. Tomchick, M. M. Benning, D. A. Winkelmann, G. Wesenberg and H. M. Holden. 1993. Three-dimensional structure of myosin subfragment- 1: A molecular motor. *Science* 261: 50–58. [P]

Sweeney, H. L. and A. Houdusse. 2010. Myosin VI rewrites the rules for myosin motors. *Cell* 141: 573–582. [R]

**14.3 Microtubules**

Akhmanova, A. and M. O. Steinmetz. 2008. Tracking the ends: a dynamic protein network controls the fate of microtubule tips. *Nature Rev. Mol. Cell Biol.* 9: 309–322. [R]

Al-Bassam, J. and F. Chang. 2011. Regulation of microtubule dynamics by TOG-domain proteins XMAP215/Dis1 and CLASP. *Trends Cell Biol.* 21: 604–614. [R]

Barisic, M. and H. Maiato. 2016. The tubulin code: a navigation system for chromosomes during mitosis. *Trends Cell Biol.* 26: 766-775. [R]

Conduit, P. T., A. Wainman and J. W. Raff. 2015. Centrosome function and assembly in animal cells. *Nature Rev. Mol. Cell Biol.* 16: 611-624. [R]

Gonczy, P. 2012. Towards a molecular architecture of centriole assembly. *Nature Rev. Mol. Cell Biol.* 13: 425–435. [R]

Howard, J. and A. A. Hyman. 2009. Growth, fluctuation and switching at microtubule plus ends. *Nature Rev. Mol. Cell Biol.* 10: 569–574. [R]

Janke, C. and J. C. Bulinski. 2011. Posttranslational regulation of the microtubule cytoskeleton: mechanisms and functions. *Nature Rev. Mol. Cell Biol.* 12: 773–785. [R]

Kueh, H. Y. and T. J. Mitchison. 2009. Structural plasticity in actin and tubulin polymer dynamics. *Science* 325: 960–963. [R]

Mennella, V., D. A. Agard, B. Huang and L. Pelletier. 2014. Amorphous no more: subdiffraction view of the pericentriolar material architecture. *Trends Cell Biol.* 24: 188–197. [R]

Mitchison, T. and M. Kirschner. 1984. Dynamic instability of microtubule growth. *Nature* 312: 237–242. [P]

Nogales, E., M. Whittaker, R. A. Milligan and K. H. Downing. 1999. High-resolution model of the microtubule. *Cell* 96: 79–88. [P]

Osborn, M. and K. Weber. 1976. Cytoplasmic microtubules in tissue culture cells appear to grow from an organizing structure towards the plasma membrane. *Proc. Natl. Acad. Sci. USA* 73: 867–871. [P]

Wasteneys, G. O. and J. C. Ambrose. 2009. Spatial organization of plant cortical microtubules: close encounters of the 2D kind. *Trends Cell Biol.* 19: 62–71. [R]

**14.4 Microtubule Motors and Movement**

Bettencourt-Dias, M., F. Hildebrandt, D. Pellman, G. Woods and S. A. Godinho. 2011. Centrosomes and cilia in human disease. *Trends Genet.* 27: 307–315. [R]

Bhabha, G., G. T. Johnson, C. M. Schroeder and R. D. Vale. 2016. How dynein moves along microtubules. *Trends Biochem. Sci.* 41: 94-105. [R]

Brady, S. T. 1985. A novel brain ATPase with properties expected for the fast axonal motor. *Nature* 317: 73–75. [P]

Brady, S. T., R. J. Lasek and R. D. Allen. 1982. Fast axonal transport in extruded axoplasm from squid giant axon. *Science* 218: 1129–1131. [P]

Cross, R. A. and A. McAinsh. 2014. Prime movers: the mechanochemistry of mitotic kinesins. *Nature Rev. Mol. Cell Biol.* 15: 257–271. [R]

Gennerich, A. and R. D. Vale. 2009. Walking the walk: how kinesin and dynein coordinate their steps. *Curr. Opin. Cell Biol.* 21: 59–67. [R]

Gibbons, I. R. and A. Rowe. 1965. Dynein: A protein with adenosine triphosphatase activity from cilia. *Science* 149: 424–426. [P]

Hammond, J. W., D. Cai and K. J. Verhey. 2008. Tubulin modifications and their cellular functions. *Curr. Opin. Cell Biol.* 20: 71–76. [R]

Hirokawa, N., Y. Noda, Y. Tanaka and S. Niwa. 2009. Kinesin superfamily motor proteins and intracellular transport. *Nature Rev. Mol. Cell Biol.* 10: 682–696. [R]

Kardon, J. R. and R. D. Vale. 2009. Regulators of the cytoplasmic dynein motor. *Nature Rev. Mol. Cell Biol.* 10: 854–864. [R]

Lasek, R. J. and S. T. Brady. 1985. Attachment of transported vesicles to microtubules in axoplasm is facilitated by AMP-PNP. *Nature* 316: 645–647. [P]

Lüders, J. and T. Stearns. 2007. Microtubule-organizing centres: a re-evaluation. *Nature Rev. Mol. Cell Biol.* 8: 161–167. [R]

Marx, A., A. Hoenger and E. Mandelkow. 2009. Structures of kinesin motor proteins. *Cell Motil. Cytoskeleton* 66: 958–966. [R]

Nigg, E. A. and T. Stearns. 2011. The centrosome cycle: Centriole biogenesis, duplication and inherent asymmetries. *Nature Cell Biol.* 13: 1154–1160. [R]

Pedersen, L. B., I. R. Veland, J. M. Schroder and S. T. Christensen. 2008. Assembly of primary cilia. *Dev. Dyn*. 237: 1993–2006. [R]

Prosser, S. L. and L. Pelletier. 2017. Mitotic spindle assembly in animal cells: a fine balancing act. *Nature Rev. Mol. Cell Biol.* 18: 187-201. [R]

Roberts, A. J., T. Kon, P. J. Knight, K. Sutoh and S. A. Burgess. 2013. Functions and mechanics of dynein motor proteins. *Nature Rev. Mol. Cell Biol.* 14: 713-726. [R]

Salmon, E. D. 1995. VE-DIC light microscopy and the discovery of kinesin. *Trends Cell Biol.* 5: 154–157. [R]

Sanchez, I. and B. D. Dynlacht. 2016. Cilium assembly and disassembly. *Nature Cell Biol.* 18: 711-717. [R]

Scholey, J. M., I. Brust-Mascher and A. Mogilner. 2003. Cell division. *Nature* 422: 746–752. [R]

Vale, R. D. 2003. The molecular motor toolbox for intracellular transport. *Cell* 112: 467–480. [R]

Vale, R. D., T. S. Reese and M. P. Sheetz. 1985. Identification of a novel force-generating protein, kinesin, involved in microtubule-based motility. *Cell* 42: 39–50. [P]

**14.5 Intermediate Filaments**

Coulombe, P. A., M. E. Hutton, A. Letai, A. Hebert, A. S. Paller and E. Fuchs. 1991. Point mutations in human keratin 14 genes of epidermolysis bullosa simplex patients: Genetic and functional analyses. *Cell* 66: 1301–1311. [P]

Epstein, E. H., Jr., J. M. Bonifas, and A. L. Rothman. 1991. Epidermolysis bullosa simplex: Evidence in two families for keratin gene abnormalities. *Science* 254: 1202–1205. [P]

Fuchs, E. and D. W. Cleveland. 1998. A structural scaffolding of intermediate filaments in health and disease. *Science* 279: 514–519. [R]

Goldfarb, L. G. and M. C. Dalakas. 2009. Tragedy in a heartbeat: malfunctioning desmin causes skeletal and cardiac muscle disease. *J. Clin. Invest* 119: 1806–1813. [R]

Graumann, P. L. 2007. Cytoskeletal elements in bacteria. *Ann. Rev. Microbiol.* 61: 589–618. [R]

Herrmann, H., H. Bar, L. Kreplak, S. V. Strelkov and U. Aebi. 2007. Intermediate filaments: from cell architecture to nanomechanics. *Nature Rev. Mol. Cell Biol.* 8: 562–573. [R]

Kim, S. and P. A. Coulombe. 2007. Intermediate filament scaffolds fulfill mechanical, organizational, and signaling functions in the cytoplasm. *Genes Dev.* 21: 1581–1597. [R]

Suozzi, K. C., X. Wu and E. Fuchs. 2012. Spectraplakins: Master orchestrators of cytoskeletal dynamics. *J. Cell Biol.* 197: 465–475. [R]

Wiche, G. and L. Winter. 2011. Plectin isoforms as organizers of intermediate filament cytoarchitecture. *Bioarchitecture.* 1: 14–20. [R]