Life of the Cell: Philosophy & History of Cell Research

Pre-workshop reading list

The list below suggests material you may find useful to read as preparation for the workshop. Speakers have indicated material of specific relevance to their talks, and there is also a list of general historical and scientific treatments of topics that are pertinent to the workshop. Apart from Bill Bechtel's own papers, any philosophical discussion is embedded in scientific and historical papers rather than in explicitly philosophical work.

Many of the papers below are available online through most University's subscription schemes or as open access (via PubMed Central or other repositories, such as personal websites). Enter the 'PMID' into PubMed (www.ncbi.nlm.nih.gov/sites/entrez) to find the abstract and a link to the online journal article. Anything you cannot access because it isn't open access, or your University does not have a subscription, or because it has not been digitized, is available on request from the workshop organizers. Please email us to ask for copies. These will probably have to be posted, so allow some time before the workshop.

William Bechtel

All papers available at: http://mechanism.ucsd.edu/~bill/research.html

(in press). Generalization and discovery through conserved mechanisms: Cross-species research on circadian oscillators. *Philosophy of Science*.

(in press). The downs and ups of mechanistic research: Circadian rhythm research as an exemplar. *Erkenntnis*.

(2007). Biological mechanisms: Organized to maintain autonomy. In *Systems Biology; Philosophical Foundations,* edited by F. Boogerd, et al. (New York: Elsevier) pp. 269-302.

Bechtel, W. and Abrahamsen, A (2007). In search of mitochondrial mechanisms: Interfield excursions between cell biology and biochemistry. *Journal of the History of Biology*, 40, 1-33.

Thomas Cavalier Smith

Cavalier-Smith, T. (2009). Predation and eukaryote cell origins: A coevolutionary perspective. *International Journal of Biochemistry and Cell Biology*, 41(2):307-322. PMID: 18935970

Cavalier-Smith, T. (2006). Cell evolution and earth history: Stasis and revolution. *Philosophical Transactions of the Royal Society London B*, 361: 969-1006. PMID: 16754610

Cavalier-Smith, T. (2005). Economy, speed, and size matter: Evolutionary forces driving nuclear genome miniaturization and expansion. *Annals of Botany*, 95: 147-175. PMID: 15596464

Cavalier-Smith, T. (2004). The membranome and membrane heredity in development and evolution. In *Organelles, Genomes and Eukaryote Phylogeny*, edited by R. P. Hirt & D. S. Horner (London: Taylor & Francis), pp. 335-351.
http://www.crcpress.co.uk/shopping_cart/products/product_detail.asp?sku=TF1592&parent_id=1031&pc=

Cavalier-Smith, T. (2002). Origins of the machinery of recombination and sex. *Heredity*, 88: 125-41. PMID: 11932771

Cavalier-Smith, T. (2001). Obcells as proto-organisms: Membrane heredity, lithophosphorylation, and the origins of the genetic code, the first cells, and photosynthesis. *Journal of Molecular Evolution*, 53: 555-595. PMID: 11675615

Cavalier-Smith, T. (2000). Membrane heredity and early chloroplast evolution. *Trends in Plant Science* 5, 174-182. PMID: 10740299

Baker, J.R. (1948-1955).The cell-theory: a restatement, history, and critique, Parts I-IV. *Quarterly Journal of Microscopical Science*.
All five papers (plus an addendum to Part 2) are available free from jcs.biologists.org/cgi/content/
Click on ‘search’, and enter ‘Baker’ and ‘Cell theory’.
The essays have also been reprinted as a book:
Baker, J. R. (1988). *The Cell Theory. A Restatement, History, and Critique* (New York: Garland).

Hughes, A.F.W. (1959). A history of cytology (New York: Abelard–Schuman).
For short previews of each chapter, go to:
www.questia.com/PM.qst?a=o&d=6173760

Stanier, R.Y., and Van Niel, C. B. (1962). The concept of a bacterium. *Archiv für Mikrobiologie,* 42: 17-35. PMID: 13916221

Stanier, R.Y. (1970). Some aspects of the biology of cells and their possible evolutionary significance. In *Organization and Control in Prokaryotic and Eukaryotic Cells*, edited by H. P. Charles & J. G. Knight (Cambridge: Cambridge University Press), pp. 1–38.

Taylor, F.J. (1979). Symbionticism revisited: a discussion of the evolutionary impact of intracellular symbioses. *Proceedings of the Royal Society London, B Biological Sciences,* 204: 267-286. PMID: 36627

Ohad Parnes

Papers available at:
http://www.zfl.gwz-berlin.de/mitarbeiter/mitarbeiter/_/81/?cHash=1b31cc9532

Parnes, O.S. (2000). The envisioning of cells. *Science in Context*, 13:71-92. PMID: 11624368

Parnes, O.S. (2002). From agents to cells: Theodor Schwann's research notes of the years 1835-1838. In *Reworking the Bench. Research Notes in the History of Science*, edited by F. L. Holmes, J. Renn and H.–J. Rheinberger (Dordrecht: Kluwer), pp. 119-139.

Schwann, T. (1847). Theory of the cells. In Schwann's *Microscopic Investigations Into the Accordance in the Structure and Growth of Plants and Animals*. (London: Printed for the Sydenham Society), pp. 186-215.
The complete work can be found online here:
http://vlp.mpiwg-berlin.mpg.de/library/data/lit28715/index_html?pn=7
The chapter is also available from the workshop organizers as a pdf file.

Andrew Reynolds

Dobell, C.C. (1911). The principles of protistology. *Archiv für Protistenkunde* 23(3): 269-310.
If you cannot access the classic version, try this paper:
Corliss, J.O. (1999). Annotated excerpts from Clifford Dobell's 88-year-old insightful classic paper, "The Principles of Protistology". *Protist*, 150: 85-98. PMID: 10724521

Reynolds, A.S. (2008). Amoebae as exemplary cells: The protean nature of an elementary organism. *Journal of the History of Biology*, 41(2): 307-337. PMID: 19049233

Reynolds, A.S. (2007). The theory of the cell-state and the question of cell autonomy in nineteenth and early-twentieth century biology. *Science in Context* 20(1): 71-95. PMID: 17575863

Reynolds, A.S. (2007). The cell's journey: From metaphorical to literal factory. *Endeavour*, 31(2): 65-70. PMID: 17604105

John Bryant and Steve Hughes

Baluška, F., Volkmann, D., and Barlow, P.W. (2004). Eukaryotic cells and their cell bodies: Cell theory revised. *Annals of Botany*, 94: 9-32. PMID: 15155376

Boisnard-Lorig, C., Colon-Carmona, A., Bauch, M., et al. (2001). Dynamic analyses of the expression of the HISTONR::YFP fusion protein in arabidopsis show that syncytial endosperm is divided in mitotic domains. *Plant Cell*, 13: 495-509. PMID: 11251092

Holbrook, N.M., Zwieniecki, M.A., and Melcher, P.J. (2002). The dynamics of 'dead wood': Maintenance of water transport through plant stems. *Integrative and Comparative Biology*, 42: 492-496. http://icb.oxfordjournals.org/cgi/content/abstract/42/3/492

Lloyd, C.W., and Chan, J. (2005). Not so divided: The common basis of plant and animal cell division. *Nature Reviews Molecular Cell Biology*, 7: 147-152. PMID: 16493420

Rogers, H.J. (2005). Cell death and organ development in plants. *Current Topics in Developmental Biology*, 71: 225-61. PMID: 16344107

van Bel A.J.E. (2003). The phloem, a miracle of ingenuity. *Plant, Cell and Environment*, 26: 125-149. http://www3.interscience.wiley.com/journal/118877762/abstract

General

Arendt, D. (2008). The evolution of cell types in animals: Emerging principles from molecular studies. *Nature Reviews Genetics*, 9: 868-882. PMID: 18927580

Campbell, I.D. (2008). The Croonian Lecture 2006: Structure of the living cell. *Philosophical Transactions of the Royal Society B*, 363: 2379-2391. PMID: 17255009

Canguilhem, G. (2008 [1965]). Cell theory. In *The knowledge of life* (NY: Fordham University Press), pp. 25-56. http://www.fordhampress.com/detail.html?session=7701dde8ffb5a01794a94a9f51cf7242acc&id=9780823229260

Churchill, F.B. (1989). The guts of the matter. Infusoria from Ehrenberg to Bütschli: 1838-1876. *Journal of the History of Biology*, 22: 189-213. PMID: 11608945

Corliss, J.O. (1989). The protozoon and the cell: A brief twentieth century overview. *Journal of the History of Biology*, 22: 307-323. PMID: 11608949

Harold, F. M. (2005). Molecules into cells: Specifying spatial architecture. *Microbiology and Molecular Biology Reviews*, 69: 544-564. PMID: 16339735

Jacobs, N.X. (1989). From unit to unity: Protozoology, cell theory, and the new concept of life. *Journal of the History of Biology*, 22: 215-242. PMID: 11608946

Kaplan, D. R., and Hagemann, W. (1991). The relationship of cell and organism in vascular plants. *BioScience*, 41: 693-703. http://www.jstor.org/stable/1311764

Lintilhac, P. M. (1999). Toward a theory of cellularity – speculations on the nature of the living cell. *BioScience*, 49: 59-68. PMID: 11543344

Lustig, A.J. (2000). Sex, death, and evolution in proto- and metazoa, 1876–1913. *Journal of the History of Biology*, 33: 241-226. http://www.springerlink.com/content/n673n18g97n05817/

Mendelsohn, A.J. (2003). Lives of the cell. *Journal of the History of Biology*, 36: 1-37. PMID: 12778897

Nurse, P. (2000). The incredible life and times of cells. *Science*, 289: 1711-1716. PMID: 11001740

Puck, T.T. (1978). The Gordon Wilson Lecture: The new cell biology and its implications for medicine. *Transactions of the American Clinical and Climatological Association*, 89: 77-84. PMID: 617024

Richmond, M.L. (1989). Protozoa as precursors of metazoa: German cell theory and its critics at the turn of the century. *Journal of the History of Biology*, 22: 243-276. PMID: 11608947

Richmond, M.L. (2000). T.H. Huxley's criticism of German cell theory: An epigenetic and physiological interpretation of cell structure. *Journal of the History of Biology*, 33: 247-289. PMID: 11640226

Robinson, C. V., Sali, A., and Baumeister, W. (2007). The molecular sociology of the cell. *Nature*, 450: 973-982. PMID: 18075576

Shepherd, V.A., Beilby, M.J., and Bisson, M.A. (2004). When is a cell not a cell? A theory relating coenocytic structure to the unusual electrophysiology of *Ventricaria ventricosa* (*Valonia ventricosa*). *Protoplasma*, 223: 79-91. PMID: 15221513

Whitman, C.O. (1893). The inadequacy of the cell-theory of development. *Journal of Morphology*, 8: 639-58.

Wilson, E.B. (1923). The physical basis of life. *Science*, 57: 277-286. Access via JSTOR. PMID: 17840081

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***American Naturalist* (1939), Vol 73, Part 749, Nov-Dec**
Symposium: The Cell Theory

Mayer, J. The Cell Theory. Its past, present and future (pp. 481-484)
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Woodruff, LL. Microscopy before the nineteenth century (pp. 485-516)
http://www.jstor.org/stable/2457598

Karling, J.S. Schleiden's Contribution to the Cell Theory (pp. 517-537)
http://www.jstor.org/stable/2457599

Conklin, E.G. Predecessors of Schleiden and Schwann (pp. 538-546)
http://www.jstor.org/stable/2457600

***American Naturalist* (1940), Vol 74, Part 750, Jan-Feb**
Symposium: The Cell Theory II

Baitsell, G.A. A Modern Concept of the Cell as a Structural Unit (pp. 5-24)
http://www.jstor.org/stable/2457319

Schrader, F. The Present Status of Mitosis (pp. 25-33)
http://www.jstor.org/stable/2457320

Weiss, P. The Problem of Cell Individuality in Development (pp. 34-46)
www.jstor.org/stable/2457321

McClung, C.E. What of the Future? (pp. 47-53)
http://www.jstor.org/stable/2457322