

Curriculum Vitae

Richard H. Kessin, Ph.D,
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Professor of Pathology and Cell Biology, Emeritus, Columbia University
Emeritus July 1, 2015

Work Experience

- 2015-present: Special Lecturer, Department of Pathology and Cell Biology
1996-2015:
1996-2015: Professor, Department of Pathology & Cell Biology, Columbia University
2006-2007: Visiting Professor, Department of Molecular and Human Genetics, Baylor
College of Medicine.
Adjunct Visiting Professor, Department of Ecology and Evolutionary
Biology, Rice University
2000-2005: Associate Dean of Graduate Affairs, Columbia University

1983-1996: Associate Professor, Department of Anatomy and Cell Biology, Columbia
University, College of Physicians & Surgeons, 630 West 168th Street,
New York, NY 10032
1974-1983: Assistant and Associate Professor of Biology, Department of Cellular and
Developmental Biology, Harvard University, Cambridge, MA 02138

Education:

Yale University	B.A.	1966	Biology
Institut Gustave Roussy, France	Fulbright	1966-67	Biology
Brandeis University, Waltham, MA.	Ph.D.	1971	Biology
University of Oxford, Oxford, UK	Post- doctoral	1970-72	Genetics
Brown University	Post- doctoral	1972-73	Genetics

Honors and Awards: 1966-1967: Fulbright Fellowship, Paris, France
1970-1973: Damon Runyon Fellowship, Oxford, UK
1975-1980: Career Development Award, NIH

Professional Service

2000-2005: Associate Dean of Graduate Affairs, Columbia University

1995-2000: Editorial Board: Microbiology
2000-2005: Editorial Boards: Protist, Autophagy, The Harvey Society
1992-1997: CBY1 study section
1988, 1997: Organizer; International *Dictyostelium* meetings at Airlie and Snowbird.
1988-2000 Director or co-director of Graduate Studies, Department of Anatomy and Cell Biology.
2000-2013 Executive Committee of The Graduate School of Arts and Sciences

Teaching: Genetics, 1974-1981; Cell Biology and Histology for Medical Students, 1983-2000; The Responsible Conduct of Research, 2000-2015. I have continuously teaching in cell and molecular biology courses, as well as in graduate seminars. I taught writing and speaking courses when I was the Director of Graduate Studies in the Department of Pathology and Cell Biology at Columbia.

Duties as Associate Dean: The Associate Dean of Graduate Students at the Columbia University Medical Center supervises nearly 400 students in 10 Ph.D programs. The office has five people who help administer the various programs. The budget was approximately \$8 million. The Associate Dean interacts with the Dean of the College of Physicians and Surgeons and also with the Dean of the Graduate School of Arts and Sciences, which is responsible for all graduate programs at Columbia University. The Associate Dean is responsible for recruiting graduate students, including minority students, the latter obligation constituting a major commitment. The Associate Dean is the course director of the required Responsible Conduct of Research Course taken by all graduate students. The office of the Associate Dean has a staff of five and reviews graduate courses and takes corrective action when necessary. With the help of the individual program Directors of Graduate Studies, our office was in contact with all graduate students and intervened when there were academic, psychological, health, housing, or other problems.

My goal as Associate Dean was to promote the Ph.D programs on a medical school campus and make them an intellectual force that would be helpful to all of the faculties. In this context we organized a successful lecture series in the History of Science, which got clinicians and basic scientists together. I wrote articles on the accomplishments of our best graduate students for P&S, the magazine of the alumni/ae of The Columbia University College of Physicians and Surgeons. As much as possible we engaged colleagues in the clinical faculties for fund raising or other purposes.

I was also heavily involved in recruiting graduate students, and particularly in the recruitment of minority students to PhD programs.

Languages: French

Ph.D Students:

Lin. Wu (1993): The Phosphodiesterase Inhibitor Gene and its Role in Development of *Dictyostelium discoideum*. Current position: Senior Research Associate, Harvard Medical School

Richard Sugang (1996): Phenotypic Effects of Phosphodiesterase Gene Knockouts in *Dictyostelium*. Current position: Associate Professor, Baylor College of Medicine, Houston, TX

Fernando Villalba Diaz (1995): Biological Effects of the Degradation Cyclic Nucleotides in Eukaryotic Cells. Current position: Glaxo Smith-Kline, Madrid, Spain.

Stefan Pukatzi (2002): The Role of NosA and SonA in Proteolysis during *Dictyostelium* Development. Current position: Professor, The University of Colorado Medical Center.

Dee Dao (2000): The F-box Protein CtrA Causes *Dictyostelium* Amoebae to form spores. Current position: Formerly, Senior Research Associate, The Albert Einstein College of Medicine, now in venture capital for biomedical startup companies.

Grant Otto (2004): Protein Degradation during the development of *Dictyostelium discoideum*. Current position: Research fellow, University of London.

Turgay Tekinay (2005): The Autophagy Genes Atg1 and AtgN during *Dictyostelium* development. (Associate Professor Bilkent University, Turkey)

Grant Support: Continuous NIH support for 35 years. Periodic NSF support.

Publications (partial list):

Book:

Kessin, R. H. 2001. *Dictyostelium* - Evolution, Cell Biology, and the Development of Multicellularity., 300p. Cambridge Univ. Press, Cambridge, UK. This single author book covers all aspects of this model organism.

Articles and Reviews:

Kessin, R. H. 1972. Aspects of RNA metabolism in *Dictyostelium discoideum*. PhD. Brandeis Univ., Waltham, MA.

Kessin, R. H. 1973. RNA metabolism during vegetative growth and morphogenesis of the cellular slime mold *Dictyostelium discoideum*. Dev. Biol. 31:242-251.

Kessin, R. H., and P. C. Newell. 1974. Isolation of germination mutants of *Dictyostelium discoideum*. J. Bacteriol. 117:379-381.

Kessin, R. H., K. L. Williams, and P. C. Newell. 1974. Linkage analysis in *Dictyostelium discoideum* using temperature-sensitive growth mutants selected with bromodeoxyuridine. J. Bacteriol. 119:776-783.

Williams, K. L., R. H. Kessin, and P. C. Newell. 1974. Parasexual genetics in *Dictyostelium discoideum*: Mitotic analysis of acriflavin resistance and growth in axenic medium. J. Gen. Microbiol. 84:59-69.

- Williams, K. L., R. H. Kessin, and P. C. Newell. 1974. Genetics of growth in axenic medium of the cellular slime mould *Dictyostelium discoideum*. *Nature* 247:142-143.
- Franke, J., and R. Kessin. 1977. A defined minimal medium for axenic strains of *Dictyostelium discoideum*. *Proc. Natl. Acad. Sci. USA* 74:2157-2161.
- Kessin, R. 1977. Mutations causing rapid development of *Dictyostelium discoideum*. *Cell* 10:703-708.
- Franke, J., and R. Kessin. 1978. Auxotrophic mutants of *Dictyostelium discoideum*. *Nature* 272:537-538.
- Kessin, R. H., S. J. Orlow, R. I. Shapiro, and J. Franke. 1979. Binding of inhibitor alters kinetic and physical properties of extracellular cyclic AMP phosphodiesterase from *Dictyostelium discoideum*. *Proc. Natl. Acad. Sci. USA* 76:5450-5454.
- Franke, J., and R. H. Kessin. 1981. The cyclic nucleotide phosphodiesterase inhibitory protein of *Dictyostelium discoideum*. Purification and characterization. *J. Biol. Chem.* 256:7628-7637.
- Kessin, R. H. 1981. Conservatism in slime mold development. *Cell* 27:241-243.
- Orlow, S. J., I. Shapiro, J. Franke, and R. H. Kessin. 1981. The extracellular cyclic nucleotide phosphodiesterase of *Dictyostelium discoideum*. Purification and characterization. *J. Biol. Chem.* 256:7620-7627.
- Jacquet, M., E. Boy-Marcotte, C. Rossier, and R. H. Kessin. 1982. A fragment of *Dictyostelium discoideum* genomic DNA that complements the *ura1* mutation of *Saccharomyces cerevisiae*. *J. Mol. Appl. Genet.* 1:513-525.
- Rossier, C., J. Franke, I. A. Mullens, K. J. Kelley, and R. H. Kessin. 1983. Detection and regulation of the mRNA for the inhibitor of extracellular cAMP phosphodiesterase of *Dictyostelium discoideum*. *Eur. J. Biochem.* 133:383-391.
- Shapiro, R. I., J. Franke, E. J. Luna, and R. H. Kessin. 1983. A comparison of the membrane-bound and extracellular cyclic AMP phosphodiesterases of *Dictyostelium discoideum*. *Biochim. Biophys. Acta* 758:49-57.
- Mullens, I. A., J. Franke, D. J. Kappes, and R. H. Kessin. 1984. Developmental regulation of the cyclic-nucleotide-phosphodiesterase mRNA of *Dictyostelium discoideum*. Analysis by cell-free translation and immunoprecipitation. *Eur. J. Biochem.* 142:409-415.
- de Gunzburg, J., J. Franke, R. H. Kessin, and M. Veron. 1986. Detection and developmental regulation of the mRNA for the regulatory subunit of the cAMP-dependent protein kinase of *D. discoideum* by cell-free translation. *EMBO J.* 5:363-367.
- Lacombe, M. L., G. J. Podgorski, J. Franke, and R. H. Kessin. 1986. Molecular cloning and developmental expression of the cyclic nucleotide phosphodiesterase gene of *Dictyostelium discoideum*. *J. Biol. Chem.* 261:16811-16817.
- Podgorski, G. J., J. Franke, and R. H. Kessin. 1986. Isolation of a cDNA encoding a portion of the cyclic nucleotide phosphodiesterase of *Dictyostelium discoideum*. *J. Gen. Microbiol.* 132:1043-1050.
- Franke, J., G. J. Podgorski, and R. H. Kessin. 1987. The expression of two transcripts of the phosphodiesterase gene during the development of *Dictyostelium discoideum*. *Dev. Biol.* 124:504-511.

- Podgorski, G. J., J. Franke, M. L. Lacombe, and R. H. Kessin. 1987. Regulation of the cyclic nucleotide phosphodiesterase of *Dictyostelium discoideum*, p. 361-371. In R. A. Firtel and E. H. Davidson (ed.), *Molecular Approaches to Developmental Biology*. A.R. Liss, New York.
- Faure, M., G. J. Podgorski, J. Franke, and R. H. Kessin. 1988. Disruption of *Dictyostelium discoideum* morphogenesis by overproduction of cAMP phosphodiesterase. *Proc. Natl. Acad. Sci. USA* 85:8076-8080.
- Kessin, R. 1988. Genetics of early *Dictyostelium discoideum* development. *Microbiol. Rev.* 52:29-49.
- Podgorski, G. J., M. Faure, J. Franke, and R. H. Kessin. 1988. The cyclic nucleotide phosphodiesterase of *Dictyostelium discoideum*: the structure of the gene and its regulation and role in development. *Dev. Genet.* 9:267-278.
- Faure, M., G. J. Podgorski, J. Franke, and R. H. Kessin. 1989. Rescue of a *Dictyostelium discoideum* mutant defective in cyclic nucleotide phosphodiesterase. *Dev. Biol.* 131:366-372.
- Podgorski, G. J., J. Franke, M. Faure, and R. H. Kessin. 1989. The cyclic nucleotide phosphodiesterase gene of *Dictyostelium discoideum* utilizes alternate promoters and splicing for the synthesis of multiple mRNAs. *Mol. Cell. Biol.* 9:3938-3950.
- Faure, M., J. Franke, A. L. Hall, G. J. Podgorski, and R. H. Kessin. 1990. The cyclic nucleotide phosphodiesterase gene of *Dictyostelium discoideum* contains three promoters specific for growth, aggregation, and late development. *Mol. Cell. Biol.* 10:1921-1930.
- Knecht, D. A., and R. H. Kessin. 1990. Recent advances in the molecular genetics of *Dictyostelium*. *Dev. Genet.* 11:388-390.
- Franke, J., M. Faure, L. Wu, A. L. Hall, G. J. Podgorski, and R. H. Kessin. 1991. Cyclic nucleotide phosphodiesterase of *Dictyostelium discoideum* and its glycoprotein inhibitor: structure and expression of their genes. *Dev. Genet.* 12:104-112.
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- Franke, J., and R. H. Kessin. 1992. The cyclic nucleotide phosphodiesterases of *Dictyostelium discoideum*: Molecular genetics and biochemistry. *Cell. Signal.* 4:471-478.
- Kessin, R. H., and M. M. van Lookeren Campagne. 1992. The development of a social amoeba. *Am. Scientist* 80:556-565.
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- van Lookeren Campagne, M. M., F. Villalba Diaz, E. Meacci, V. C. Manganiello, and R. H. Kessin. 1992. Selection of cDNAs for phosphodiesterases that hydrolyze guanosine 3';5'-monophosphate in *Escherichia coli*. *Sec. Mess. Phosphoprot.* 14:127-137.
- Hall, A. L., J. Franke, M. Faure, and R. H. Kessin. 1993. The role of the cyclic nucleotide phosphodiesterase of *Dictyostelium discoideum* during growth, aggregation, and morphogenesis: overexpression and localization studies with the separate promoters of the pde. *Dev. Biol.* 157:73-84.

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- Kessin, R. H. 2000. Evolutionary biology - Cooperation can be dangerous., p. 917-919. *Nature*, vol. 408.
- Pukatzki, S., H. L. Ennis, and R. H. Kessin. 2000. A genetic interaction between a ubiquitin-like protein and ubiquitin-mediated proteolysis in *Dictyostelium discoideum*. *Biochim. Biophys. Acta* 1499:154-163.
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- Pukatzki, S., R. H. Kessin, and J. J. Mekalanos. 2002. The human pathogen *Pseudomonas aeruginosa* utilizes conserved virulence pathways to infect the social amoeba *Dictyostelium discoideum*. *Proc. Natl. Acad. Sci. USA* 99:3159-3164.
- Ennis, H. L., D. N. Dao, M. Y. Wu, and R. H. Kessin. 2003. Mutation of the *Dictyostelium* *fbxA* gene affects cell-fate decisions and spatial patterning. *Protist* 154:419-429.

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- Tekinay, T., H. L. Ennis, M. Y. Wu, M. Nelson, R. H. Kessin, and D. I. Ratner. 2003. Genetic interactions of the E3 ubiquitin ligase component FbxA with cyclic AMP metabolism and a histidine kinase signaling pathway during *Dictyostelium discoideum* development. *Euk. Cell* 2:618-626.
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- Kosta, A., C. Roisin-Bouffay, M. F. Luciani, G. P. Otto, R. H. Kessin, and P. Golstein. 2004. Autophagy gene disruption reveals a non-vacuolar cell death pathway in *Dictyostelium*. *J. Biol. Chem.* 279:48404-48409.
- Otto, G. P., M. Y. Wu, M. Clarke, H. Lu, O. R. Anderson, H. Hilbi, H. A. Shuman, and R. H. Kessin. 2004. Macroautophagy is dispensable for intracellular replication of *Legionella pneumophila* in *Dictyostelium discoideum*. *Mol. Microbiol.* 51:63-72.
- Otto, G. P., M. Y. Wu, N. Kazgan, O. R. Anderson, and R. H. Kessin. 2004. *Dictyostelium* macroautophagy mutants vary in the severity of their developmental defects. *J. Biol. Chem.* 279:15621-15629..
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- R.H. Kessin. The secret lives of *Dictyostelium discoideum*, in: *Methods for Research on Dictyostelium discoideum*. Eds. L. Eichinger and F. Rivera, Humana Press (2006).
- Clément Nizak, Robert J. Fitzhenry, and Richard H. Kessin. Exploitation of other social amoebae by *Dictyostelium caveatum*. (2007) *PLoS One*, 2(2) e212. doi:10.1371/journal.pone.000212
- Gad Shaulsky and Richard H. Kessin. The Cold War of the Social Amoebae. *Current Biology*, 17:R684-R692 (2007)
- J. Zucko, N. Skunka, T. Curk, P.F. Long, J. Cullum, R. H. Kessin and D. Hranueli Polyketide synthase genes and the natural products potential of *Dictyostelium discoideum*. *Bioinformatics* July 27, 2007

Science Journalism and Science Fiction:

The Body Scientific: A series of columns for The Lakeville Journal and associated newspapers in Litchfield County, CT. These columns, of which there have been about 40 since 2010, explain science to non-scientists. They cover everything from vaccines to GMO crops to the PCBs in the Housatonic River. Occasionally, other Columbia faculty write guest columns. The columns are available at: <http://www.tricornernews.com/search/node/Kessin>. They will be made into a book.

The Famine of Men: A novel in which a young assistant professor discovers a virus that destroys the ability of men to make testosterone. She cannot anticipate the strange

events that follow as the virus becomes pandemic. The book has been well reviewed and is available from Authorhouse.com or Amazon.com.

Science Education for the Public:

The Taconic Learning Center: This is a teaching organization that covers everything from Plato to Molecular Biology. I teach a course in molecular medicine. The next offering will be called: How Your Immune System Works. In 2015 there were about 20 participants. This year there will be more.