

Curriculum Vitae

Geraldine Seydoux, Ph. D.

Huntington Sheldon Professor of Medical Discovery
Dept. of Molecular Biology and Genetics
Johns Hopkins University School of Medicine
725 N. Wolfe Street / 706 PCTB Baltimore, MD 21205-2185
Tel: 410-614-4622 email: gseydoux@jhmi.edu

Education

B. S. 1986 University of Maine at Orono. Biochemistry

Ph. D. 1991 Princeton University
Molecular Biology - Mentor: Dr. Iva Greenwald

Post-doctorate Carnegie Institution of Washington
1995 Developmental Biology - Mentor: Dr. Andrew Fire

Professional Experience

1995 - present Assistant (1995) Associate (2000) Full (2004) Professor
Department of Molecular Biology and Genetics
The Johns Hopkins University, School of Medicine

2005 - present Investigator, Howard Hughes Medical Institute

2011- present Editor, *Development*

Research focus

Oocyte-to-embryo transition and the soma-germline dichotomy in *C. elegans*.

Honors

1984-86 Totman Scholarship, University of Maine

1986 Graduated Summa Cum Laude, University of Maine

1986-87 Princeton Fellowship

1988-91 Howard Hughes Medical Institute Pre-Doctoral Fellowship

1991-94 Helen Hay Whitney Post-Doctoral Fellowship

1996-98 Basil O'Connor Starter Scholar Research Award, March of Dimes

1996-99 Junior Faculty Research Award, American Cancer Society

1996-01 David and Lucile Packard Fellowship for Science and Engineering

1996-99 Searle Scholar Program, The Chicago Community Trust

1999 Presidential Early Career Award for Scientists and Engineers (PECASE) - NIH

2001-3 Kirsch Investigator Award, Steve and Michele Kirsch Foundation

2001-6 John D. and Catherine T. MacArthur Fellowship

2010 Professors' Award for Excellence in Teaching in the Preclinical Sciences

2013 Election to the American Academy of Arts and Sciences

2014 Burton L. Baker Lecture - Cell and Dev. Biology, U. of Michigan

2015 The Huntington Sheldon, MD Professorship in Medical Discovery

2015 Nancy Rafferty Lecture, Marine Biological Laboratory, Woods Hole, MA

PUBLIC SERVICE

Society Boards

Genetic Society of America, member - Board of Directors 2005-2008

Society for Developmental Biology, member – Board of Directors 2014-17

Conference Organizer

2000 Germ Cells Meeting, Cold Spring Harbor Laboratories, Cold Spring Harbor NY
Co-organizer with Chris Wylie, U. of Minnesota

2003 International *C. elegans* Meeting, UCLA, Los Angeles
Co-head organizer with Stuart Kim, Stanford University

2005 International *C. elegans* Meeting, UCLA, Los Angeles – Program Committee

2008 RNA Granules Workshop, HHMI headquarters, Chevy Chase, MD
Co-organizer with Paul Anderson and Roy Parker

2010 Developmental Biology Society 69th Annual Meeting - Program Committee

2013 American Society of Cell Biology - Program Committee

2015 International *C. elegans* Meeting, UCLA, Los Angeles – Program Committee

2016 Germ Cells Meeting, Cold Spring Harbor Laboratories, Cold Spring Harbor NY
Co-organizer with Bob Braun, Jackson Labs

Scientific Review Panels

2001 NIH Genetics Study Section, Ad Hoc Reviewer

2001 Damon Runyon-Winchell Cancer Research Fund – Guest reviewer

2002-2003 NIH Reproductive Biology Study Section, Ad Hoc Reviewer

2003-2008 NIH Development 1 Study Section, Regular Member

2005-present Life Sciences Research Foundation, Post-doctoral Fellowships

2011-present Searle Scholars Advisory Board

2011, 13, 14 NIH Study Sections (*ad hoc*): DEV1, CHHD C 1

2013-present HHMI International pre-doctoral students

2015 HHMI Investigator competition

2016 HHMI/Gates/Simons Faculty Scholars competition

Editorial boards

2002 to present *Developmental Cell* (Advisory Board)

2004-2011, 2014-present *Worm Book* - Editor

2005 - 2010 *Development* (Advisory Board)

2009 -2013 *Cell* (Advisory Board)

2011 - present *Development* - Editor

ACADEMIC SERVICE

Teaching

Course Director

2003 -2013 *Fundamentals of Genetics*

Instructor

1996 to present *Molecules and Cells* (Medical School Course)

1997 to present *Fundamentals of Genetics*

2004 to present *Developmental Biology Elective*

2004 to present *Epigenetics Elective*

2014 to present *Lecturer – Embryology course (Woods Hole)*

Institutional Administrative Appointments

1997-present	Admissions Committee BCMB graduate program
1998-2002	Medical School Council
2000-2007	Biomedical Scholars Selection committee
2001-2002	Medical School Council Agenda Committee
2001-2004	BCMB graduate program curriculum reform committee
2002-2003	Vice-chair Radiology Search Committee
2003-present	BCMB graduate program Policy Committee
2013-present	MA/Ph. D. committee Chair – oversees graduate programs at Johns Hopkins School of Medicine

Publications

1. Seydoux, G. and Greenwald, I. (1989). Cell autonomy of *lin-12* function in a cell fate decision in *C. elegans*. **Cell** 57, 1237-1245.
2. Greenwald, I. and Seydoux, G. (1990). Analysis of gain-of-function mutations of the *lin-12* gene of *Caenorhabditis elegans*. **Nature** 346, 197-199.
3. Seydoux, G., Schedl, T. and Greenwald, I. (1990). Cell-cell interactions prevent a potential inductive interaction between soma and germline in *C. elegans*. **Cell** 61, 939-951.
4. DeVoti, J., Seydoux, G., Beach, D., McLeod, M. (1991). Interaction between ran1+ protein kinase and cAMP dependent protein kinase as negative regulators of fission yeast meiosis. **EMBO Journal** 10, 3759-68.
5. Seydoux, G., Savage, C., and Greenwald, I. (1993). Isolation and characterization of mutations causing abnormal eversion of the vulva in *Caenorhabditis elegans*. **Developmental Biology** 157, 423-436.
6. Seydoux, G. and Fire, A. (1994). Soma-germline asymmetry in the distribution of embryonic RNAs in *C. elegans*. **Development** 120, 2823-2834.
7. Bucher, E. and Seydoux, G. (1994). Gastrulation in the nematode *Caenorhabditis elegans*. **Seminars in Developmental Biology** 5, 121-130.
8. Seydoux, G. and Fire, A. (1995). Whole-mount *in situ* hybridization for the detection of RNA in *C. elegans* embryos. In *C. elegans: Modern Biological Analysis of an Organism. Methods in Cell Biology* (ed. H. Epstein and D. Shakes) Academic Press, San Diego.
9. Seydoux, G. (1996). Mechanisms of translational control in early development. **Current Opinion in Genetics and Development** 6, 555-561.
10. Seydoux, G., Mello, C. C., Pettitt, J., Wood, W., Priess, J., Fire, A. (1996). Repression of gene expression in the embryonic germ lineage of *C. elegans*. **Nature** 382, 713-716.
11. Seydoux, G. and Dunn, M. (1997). Transcriptionally-repressed germ cells lack a subpopulation of phosphorylated RNA polymerase II in early embryos of *C. elegans* and *D. melanogaster*. **Development** 124, 2191-2201.
12. Tenenhaus, C., Schubert, C., Seydoux, G. (1998). Genetic requirements for PIE-1 localization and inhibition of gene expression in the embryonic germ lineage of *Caenorhabditis elegans*. **Developmental Biology**, 200(2):212-24.
13. Prasad, B. C., Ye, B., Zackhary, R., Schrader, K., Seydoux, G., Reed, R. R. (1998). *unc-3*, a gene required for axonal guidance in *Caenorhabditis elegans*, encodes a member of the O/E family of transcription factors. **Development**, 125(8):1561-8
14. Batchelder, C., Dunn, M. A., Choy, B., Suh, Y., Cassie, C., Shim, E. Y., Shin, T. H., Mello, C., Seydoux, G., Blackwell, T. K. (1999) Transcriptional repression by the *Caenorhabditis elegans* germ-line protein PIE-1. **Genes and Development** 13(2):202-12.

15. Subramaniam, K. and Seydoux, G. (1999). *nos-1* and *nos-2*, two genes related to *Drosophila nanos*, regulate primordial germ cell development and survival in *C. elegans*. **Development** 126, 4861-4871.
16. Seydoux, G. and Strome S. (1999). Launching the germline in *C. elegans*: regulation of gene expression in early germ cells. **Development** 126, 3275-3283.
17. Seydoux G., and Schedl, T. (2000). The germline in *C. elegans*: Origins, Proliferation and Silencing. In “*Establishment of Cell Lineages and Patterning of the Embryo*”, a book in the **International Review of Cytology** Series edited by Etkin and Jeon.
18. Halpern, M. and Seydoux, G. (2000). Embryo emergent: Elucidating the cell biology of development. **Embo Reports** 1, 469-472.
19. Reese, K. J., Dunn, M. A., Waddle J. A. and Seydoux, G. (2000). Asymmetric segregation of PIE-1 in *C. elegans* is mediated by two complementary mechanisms that act through separate PIE-1 protein domains. **Molecular Cell** 6, 445-455.
20. Wallenfang, M. R., and Seydoux, G. (2000). Polarization of the anterior-posterior axis of *C. elegans* is a microtubule-directed process. **Nature** 408, 89-92.
21. Golden A., Sadler P. L., Wallenfang, M. R., Schumacher J. M., Hamill, Bates G., Bowerman B., Seydoux, G., and Shakes, D. C. (2000) Metaphase to anaphase transition defective (*mat*) mutants in *Caenorhabditis elegans*. **Journal of Cell Biology** 151, 1469-1482.
22. Tenenhaus, C., Subramaniam, K., Dunn, M. Seydoux, G. (2001). PIE-1 is a bifunctional protein that regulates maternal and zygotic gene expression in the embryonic germ lineage of *C. elegans*. **Genes and Development** 15, 1031-1040.
23. Strome, S. , Powers, J., Dunn, M., Reese, K., Seydoux, G and Saxton, W. (2001). Spindle dynamics and the role of gamma-tubulin in early *C. elegans* embryos. **Mol. Biology of the Cell** 12, 1751-64.
24. Wallenfang, M. R., and Seydoux, G. (2002). *cdk-7* is required for mRNA transcription and cell cycle progression in *C. elegans* embryos. **Proc. Nat. Acad. Sci.** 99, 5527-5532.
25. Pellettieri and Seydoux (2002). Anterior/Posterior Polarity in Worms and Flies – PARallels and Differences. **Science**, 298:1946-50.
26. Subramaniam, K. and Seydoux, G. (2003). Dedifferentiation of primary spermatocytes into germ cell tumors in *C. elegans* lacking the Pumilio-like protein PUF-8. **Current Biology** 13, 134-139.
27. Cuenca, A., Schetter A. , Aceto D., Kempfues K., Seydoux, G. (2003). Polarization of the *C. elegans* zygote proceeds via distinct establishment and maintenance phases. **Development** 130, 1255-1265.
28. Derenzo, C., Reese, K. and Seydoux, G. (2003). Exclusion of germ plasm proteins from somatic lineages by cullin-dependent degradation. **Nature** 424, 685-9.
29. Pellettieri, J., Reinke, V. , Kim, S. K. and Seydoux, G. (2003) Coordinate activation of maternal protein degradation during the Egg-to-Embryo Transition in *C. elegans*. **Developmental Cell** 5, 451–462.
30. De Renzo, C. and Seydoux, G. (2004) A clean start: coordinate degradation of maternal proteins at the egg-to-embryo transition. **Trends in Cell Biology** 14, 420-428.
31. Seydoux, G. (2004) Surfing the actomyosin wave: polarization of the *C. elegans* zygote. **Developmental Cell**, 7, 285-286.
32. Ingrid D’Agostino, Chris Merritt, Pei-Lung Chen, Geraldine Seydoux and Kuppuswamy Subramaniam (2006). Translational repression restricts expression of the *C. elegans* Nanos homolog NOS-2 to the embryonic germline. **Developmental Biology** 292 244–252.
33. Stitzel, M., Pellettieri, M. and Seydoux, G (2006) The *C. elegans* DYRK kinase MBK-2 marks oocyte proteins for degradation in response to meiotic maturation. **Current Biolog**16, 1–7.
34. Hao, Y., Boyd, L., Seydoux, G. (2006). Stabilization of cell polarity by the RING protein PAR-2. **Developmental Cell** 10, 199–208.

35. Seydoux, G (2006) The 2006 GSA medal-Victor Ambros. **Genetics**, 172(2):721-2.
36. Gallo CM, Seydoux G (2006). Toti"potent" repressors. **Bioessays**. 28(9):865-867
37. Seydoux, G and Braun, R. (2006). Pathway to totipotency: lessons from germ cells. **Cell** 127, 891-904.
38. Stitzel, M. and Seydoux, G (2007). Regulation of the oocyte-to-zygote transition. **Science** 316, 407-8.
39. Stitzel, M., Cheng, K. , Seydoux, G. (2007). Regulation of MBK-2/Dyrk kinase by dynamic cortical anchoring during the oocyte-to-zygote transition. **Current Biology**, 179:367-9.
40. Motegi, F. and Seydoux, G. (2007). Revisiting the role of microtubules in *C. elegans* polarity. **JCB** 179:367-9.
41. Lee MH, Hook B, Pan G, Kershner AM, Merritt C, Seydoux G, Thomson JA, Wickens M, Kimble J (2007) Conserved regulation of MAP kinase expression by PUF RNA-binding proteins. **PLoS Genet.** 3(12):e233.
42. Ghosh, D., Seydoux, G. (2008). Inhibition of transcription by the *C. elegans* germline protein PIE-1: genetic evidence for distinct mechanisms targeting initiation and elongation. **Genetics**, 178(1):235-43.
43. Gallo C., Munro, E., Rasoloson D., Merritt, C, and Seydoux G. (2008). Processing bodies and germ granules are distinct RNA granules that interact in *C. elegans* embryos. **Developmental Biology**, 323(1):76-87.
44. Merritt C., Rasoloson D., Ko D., Seydoux G (2008). 3' UTRs are the primary regulators of gene expression in the *C. elegans* germline. **Current Biology**, 18(19):1476-82.
45. Nakamura, A and Seydoux, G. (2008). Less is more: specification of the germline by transcriptional repression. **Development**, 135(23):3817-27.
46. Cheng K. , Klancer R. , Singson A, and Seydoux (2009) Regulation of MBK-2/DYRK by CDK-1 and the pseudo-phosphatases EGG-4 and EGG-5 during the oocyte-to-embryo transition. **Cell**, 139(3):560-72.
47. Merritt, C. , Gall, C, Rasoloson, D. and Seydoux, G. (2010). Transgenic solutions for the germline. ed. The *C. elegans* Research Community, **WormBook**, doi/10.1895/wormbook.1.148.1, <http://www.wormbook.org>.
48. Voronina, E, Seydoux, G (2010), The nucleoporin NPP-10/Nup98 is required for the integrity and function of germline P granules. **Development** 137, 1441-1450.
49. Zonies, S., Motegi, F., Hao, Y., Seydoux, G (2010). Symmetry breaking and polarization of the *C. elegans* zygote by the polarity protein PAR-2. **Development** 137:1669-1677.
50. Merritt, C., Seydoux, G (2010). The Puf RNA-binding Proteins FBF-1 and FBF-2 Inhibit the Expression of Synaptonemal Complex Proteins in Germline Stem Cells. **Development**, 137(11):1787-98.
51. Gallo, C, Wang, J. Motegi, F., Seydoux, G. (2010). Cytoplasmic partitioning of P granule components is not required to specify the germline in *C. elegans*. **Science**, 17;330(6011):1685-9.
52. Voronina, E, Seydoux, G, Sassone-Corsi, P, Nagamori, I. 2011. RNA granules in the germline. **CSH Perspectives**, Editors: Paolo Sassone-Corsi, Margaret T. Fuller, and Robert Braun, Dec 1;3(12). pii: a002774. doi: 10.1101/cshperspect.a002774.
53. Griffin, E. , Odde, D. and Seydoux, G. Regulation of the MEX-5 gradient by a spatially-segregated kinase-phosphatase cycle (2011). **Cell**, 16;146(6):955-68..
54. Motegi, F., Zonies, S., Hao, Y. Cuenca, A. , Griffin, E., Seydoux, G. (2011). Microtubules induce self-organization of polarized PAR domains in *C. elegans* zygotes. **Nature Cell Biology**, 13(11):1361-7.
55. Wang, J. and Seydoux, G. (2012). Germ cell specification. Book Chapter In *Germline development in C. elegans*. **Adv Exp Med Biol.** 2013;757:17-39.
56. Voronina E, Paix A, Seydoux G. The P granule component PGL-1 promotes the

localization and silencing activity of the PUF protein FBF-2 in germline stem cells.

Development. 2012 Oct;139(20):3732-40.

57. Seydoux, G. "Goldilocks" suppressor screens identifies web of polarity regulators.

Nature Cell Biology, 2012, 2012, 15(1):9-10. doi: 10.1038/ncb2666.

58. Motegi, F. and Seydoux, G. (2013) The PAR network: redundancy and robustness in a symmetry breaking system. **Philosophical Transactions of the Royal Society**, 368(1629):20130010.

59. Wang, Y., Wang, J. T. , Rasoloson, D., Stitzel, M. L., O'Connell K. F., Smith H. E. and Seydoux, G. (2013). Identification of suppressors of *mbk-2/DYRK* by whole-genome sequencing. **G3**, pii: g3.113.009126v1. doi: 10.1534/g3.113.009126.

60. Wang, J., Seydoux, G (2014) P granule Quick-Guide. **Current Biology** 2014 Jul 21;24(14):R637-8. doi: 10.1016/j.cub.2014.06.018. PMID: 25050955 [PubMed - in process].

61. Paix, A. , Wang, Y. Lee, CY S., Calidas, D., Lu, T. Smith, J., Schmidt, H., Seydoux, G. (2014) Scalable and Versatile Genome Editing Using Linear DNAs with Microhomology to Cas9 Sites in *Caenorhabditis elegans* **Genetics**, Vol. 198, 1–10 December 2014. doi: 10.1534/genetics.114.170423.

62. Wang, J. T., Smith, J. , Chen, B. C., Schmidt H., Rasoloson, D., Paix, A. , Lambrus, B. G., Calidas, D., Betzig, E. and Seydoux, G. 2014 Regulation of RNA granule dynamics by phosphorylation of serine-rich, intrinsically-disordered proteins in *C. elegans*. **eLife**, Dec 23;4. doi: 10.7554/eLife.04591.

63. Paix, A., Folkmann, A., Rasoloson, D., Seydoux G. (2105). High efficiency, homology-directed genome editing in *C. elegans* using CRISPR/Cas9 ribonucleoprotein complexes. **Genetics**, in press.