

CURRICULUM VITAE

NAME: Pamela Mary Stanley (nee Fetherstonhaugh)

Lab Homepage <http://www.einstein.yu.edu/departments/cellbiology/faculty/stanley/home/>

NATIONALITY: Australian/American

EDUCATION:

1965-1967 Bachelor of Science
University of Melbourne, Australia
Majored in Biochemistry and Microbiology

1968 B. Sc. Hons., Walter and Eliza Hall Institute, Melbourne, Australia
Commonwealth Post-graduate Award
Advisor: Gordon L. Ada
Thesis: Tolerance to Foreign Erythrocytes Using Antigen-Containing Extracts of the Erythrocyte Membrane.

1969-1972 Research for degree of Doctor of Philosophy in the Department of Microbiology, University of Melbourne, Australia
Commonwealth Post-graduate Award
Advisor: Professor David O. White
Thesis: Influenza Virus Proteins

1972-1975 Postdoctoral Fellow of the Medical Research Council of Canada in the Department of Medical Genetics, University of Toronto, Canada
Advisor: Dr. Louis Siminovitch
Postdoctoral Fellowship from the Medical Research Council of Canada
Topic: The Isolation and Characterization of Lectin Resistant Chinese Hamster Ovary Cells.

POSITIONS HELD:

1976 Research Associate
Department of Medical Genetics
University of Toronto
Toronto, Ontario, Canada

1977-1982 Assistant Professor
Dept. of Cell Biology
Albert Einstein College of Medicine
Bronx, New York

1982-1986 Associate Professor
Dept. of Cell Biology
Albert Einstein College of Medicine
Bronx, New York

1986-	Professor Department of Cell Biology Albert Einstein College of Medicine Bronx, New York
1994-2007	Director Training Program in Cell & Molecular Biology, Biochemistry & Genetics, T32 NIGMS
1988-2012	Program leader Membrane Molecular Biology Albert Einstein Cancer Center
2002-2020	Associate Director for Laboratory Research Albert Einstein Cancer Center
2007-	Horace W. Goldsmith Foundation Chair.

HONORS:

Dunlop Prize for First Place in Biochemistry (1966 and 1967)
Aust. Soc. for Microbiology Prize for Virology (1968)
Commonwealth post-graduate award (1969-1972)
Postdoctoral Fellowship from the Medical Research Council of Canada (1972-1975)
American Cancer Society Faculty Awards (1978-1981 and 1981-1983)
Irma T. Hirschl Faculty Award (1985-1990)
Election to Leo M. Davidoff Society for excellence in medical school teaching (1987)
MERIT Award from the National Cancer Institute, NIH (1991)
Dorothy Baugh Harmon Lectureship, Oklahoma Medical Research Foundation (1997)
Mizutani Awards (2001, 2013)
International Glycoconjugate Organization Award (2003)
Karl Meyer Award, Society for Glycobiology (2003)
Horace W. Goldsmith Foundation Chair (2007)
LaDonne Shulman award for excellence in graduate school teaching (2009)
Goldstein Lecture, Dept. Biological Chemistry, U. Michigan, Ann Arbor (2010).
Peter Gallagher memorial lecture, Griffith University, Australia (2012)
Marshall Horwitz Faculty Prize for Research Excellence (2014)
WALS lecture, National Institutes of Health (2015)
Keynote address, GRC on Glycobiology, Ventura (2017)

OTHER PROFESSIONAL ACTIVITIES:

Editorial Board Molecular and Cellular Biology (1980 - 1991).
Co-chair Gordon Conference on Glycoproteins and Glycolipids (1981)
Advisory Committee of Cell and Developmental Biology, American Cancer Society (1981-1985)
Pathobiochemistry Study Section, NIH (1989 -1993)
Editorial Board Glycobiology (1990 -)
Editorial Board Molecular Biology of the Cell (1991 - 1993).
Sabbatical, INSERM U 273, University of Nice, France, (1993 - 1994)
Board of Directors, Society for Glycobiology (1994 -1998)

Director, Cell and Molecular Biology and Genetics Graduate Training Program (1994 -)
 Editorial Board, Journal of Biological Chemistry (1995 - 2000)
 President, Society of Glycobiology (1997 - 1998)
 Society for Glycobiology Awards, Publications committees (1997-)
 Neose Technologies scientific advisory board (2001- 2005)
 Steering Committee NIGMS Glycomics "Glue" grant (2001-2011)
 Program advisor: PO1 grant Burnham Institute, San Diego (1999-2003)
 Program advisor: Score grant Hunter College, New York (2005, 2006)
 Editorial Board, Glycoconjugate Journal (2003 - 2018)
 Harvey Society Council, New York (2003-2005)
 Intercellular Communications and Interactions study section NIH (2007-2011)
 Sabbatical, Bio21, University of Melbourne, Dept. Biochem. and Molec. Biol. (2009-2010)
 Visiting Fellow, Ormond College, University of Melbourne, (2009-2010)
 ASBMB Theme Organizer, ASBMB annual meeting (2013)
 Regional Blavatnik Awards Judge NYAS (2013 - 2018)
 Editorial Board, Scientific Reports (2015 -)
 Organizer, EMBO Workshop on Glycosylation and the Golgi (2016)
 Organizer, GlycoT, Toronto (2016)
 Associate Editor for Reviews, Glycobiology (2017 -)
 FASEB Board of Directors (2017 - 2021); subcommittee on membership; 3 Capitol Hill Days
 Editorial Board, FASEB BioAdvances (2019 -)
 Associate Editor, FASEB BioAdvances (2020 -)

Societies: American Association Biological Chemists
 American Society for Cell Biology
 Society for the Study of Reproduction
 Society for Glycobiology
 American Assoc. University Women

PUBLICATIONS:

- 1) **Fetherstonhaugh, P.** (1970) The Immunogenicity and Tolerance-Inducing Ability of Soluble Extracts of Sheep Red Blood Cell Membranes. *Int. Arch. Allergy* 39:310-322.
- 2) Parish, C.R. and **Stanley, P.** (1972) Chemical and Biological Properties of Bacterial Flagellin Following Iodination and Oxidation by Chloramine-T. *Immunochemistry* 9:853-872.
- 3) **Stanley, P.** and Haslam, E.A (1971) The Polypeptides of Influenza Virus. V. Localization of Polypeptides in the Virion by Iodination Techniques. *Virology* 46:764-773.
- 4) Gandhi, S.S., **Stanley, P.**, Taylor, J.M. and White, D.O. (1972) Inhibition of Influenza Viral Glycoprotein Synthesis by Sugars. *Microbios* 5:41-50.
- 5) **Stanley, P.**, Gandhi, S.S. and White, D.O. (1973) The Polypeptides of Influenza Virus. VII. Synthesis of the Hemagglutinin. *Virology* 53:92-106.
- 6) **Stanley, P.**, Crook, N.E., Streader, L.G. and Davidson, B.E (1973) The Polypeptides of Influenza Virus. VIII. Large-Scale Purification of the Hemagglutinin. *Virology* 56:640-645.

- 7) Juliano, R.L. and **Stanley, P.** (1975) Altered Cell Surface Glycoproteins in Phytohemagglutinin-Resistant Mutants of Chinese Hamster Ovary Cells. *Biochimica et Biophysica Acta* 389:401-406.
- 8) **Stanley, P.**, Caillbot, V. and Siminovitch, L. (1975) Stable Alterations at the Cell Membrane of Chinese Hamster Ovary Cells Resistant to the Cytotoxicity of Phytohemagglutinin. *Somatic Cell Genetics* 1:3-26.
- 9) **Stanley, P.**, Narasimhan, S., Siminovitch, L. and Schachter, H. (1975) Chinese Hamster Ovary Cells Selected For Resistance to the Cytotoxicity of Phytohemagglutinin are Deficient in a UDP-*N*-Acetylglucosamine: Glycoprotein *N*-acetylglucosaminyltransferase Activity. *Proc. Natl. Acad. Sci.* 72:3323-3327.
- 10) **Stanley, P.**, Caillbot, V. and Siminovitch, L. (1975) Selection and Characterization of Eight Phenotypically Distinct Lines of Lectin-resistant Chinese Hamster Ovary Cells. *Cell* 6:121-128.
- 11) **Stanley, P.** and Siminovitch, L. (1976) Selection and Characterization of Chinese Hamster Ovary Cells Resistant to the Cytotoxicity of Lectins. *In Vitro* 12:208-215.
- 12) **Stanley, P.** and Siminovitch, L. (1977) Complementation Between Mutants of CHO Cells Resistant to a Variety of Plant Lectins. *Som. Cell Gen.* 3:391-405.
- 13) Narasimhan, S., **Stanley, P.** and Schachter, H. (1977) Control of Glycoprotein Synthesis. Lectin-Resistant Mutant Containing Only One of Two Distinct *N*-acetylglucosaminyltransferase Activities Present in Wild Type Chinese Hamster Ovary Cells. *J. Biol. Chem.* 252:3926-3933.
- 14) **Stanley, P.** and Carver, J.P. (1977) Lectin Receptors and Lectin Resistance in Chinese Hamster Ovary Cells. *Adv. in Exptl. Med. and Biol.* 84:265-282.
- 15) **Stanley, P.** and Carver, J.P. (1977) Selective Loss of Wheat Germ Agglutinin (WGA) Binding Sites on WGA-Resistant Mutants of CHO Cells. *Proc. Natl. Acad. Sci.* 74:5056-5059.
- 16) Robertson, M.A., Etchison, J.R., Robertson, J.S., Summers, D.F. and **Stanley, P.** (1978) Specific Changes in the Oligosaccharide Moieties of VSV Grown in Different Lectin-Resistant CHO Cells. *Cell* 13:515-526.
- 17) **Stanley, P.** and Carver, J.P. (1978) Binding of ¹²⁵I-Wheat Germ Agglutinin to Chinese Hamster Ovary Cells Under Conditions Which Affect Membrane Mobility. *J. Cell Biol.* 79:617-622.
- 18) **Stanley, P.** (1980) Altered Glycolipids of CHO Cells Resistant to Wheat Germ Agglutinin. *ACS Symposium Series* 128:213-221.

- 19) **Stanley, P.**, Sudo, T. and Carver, J.P. (1980) Differential Involvement of Cell Surface Sialic Acid Residues in Wheat Germ Agglutinin Binding to Parental and Wheat Germ Agglutinin - Resistant Chinese Hamster Ovary Cells. *J. Cell Biol.* 85:60-69.
- 20) **Stanley, P.** and Sudo, T. (1981) Microheterogeneity Among Carbohydrate Structures at the Cell Surface May be Important in Recognition Phenomena. *Cell* 23:763-769.
- 21) **Stanley, P.** (1981) Selection of Specific Wheat-Germ Agglutinin-Resistant (Wga^R) Phenotypes from Chinese Hamster Ovary Cell Populations Containing Numerous lec^R Genotypes. *Mol. Cell. Biol.* 1:687-696.
- 22) **Stanley, P.** (1982) Carbohydrate Heterogeneity of Vesicular Stomatitis Virus G Glycoprotein Allows Localization of the Defect in a Glycosylation Mutant of CHO Cells. *Arch. Biochem. Biophys.* 219: 128-139.
- 23) **Stanley, P.** (1983). Lectin-Resistant CHO Cells: Selection of New Mutant Phenotypes. *Somatic Cell Genetics* 9:593-608.
- 24) Campbell, C. and **Stanley, P.** (1983) Regulatory Mutations in CHO Cells Induce the Expression of the Mouse Embryonic Antigen, SSEA-I. *Cell* 35:303-309.
- 25) **Stanley, P.**, Vivona, G. and Atkinson, P.H. (1984) ¹H-NMR Spectroscopy of Carbohydrates from the G Glycoprotein of VSV Grown in Parental and Lec4 CHO Cells. *Arch. Biochem. Biophys.* 230:363-374.
- 26) Draber, P. and **Stanley, P.** (1984) Cytotoxicity of Plant Lectins for Mouse Teratocarcinoma Cells. *Somatic Cell and Molecular Genetics* 10:435-443.
- 27) Draber, P. and **Stanley, P.** (1984) Selection and Partial Characterization of Lectin-Resistant F9 Teratocarcinoma Cells. *Somatic Cell and Molecular Genetics* 10:445-454.
- 28) Campbell, C. and **Stanley, P.** (1984) The CHO Glycosylation Mutants LEC11 and LEC12 Express Two Novel GDP-Fucose: N-acetylglucosaminide 3- α -L-Fucosyltransferase Enzymes. *J. Biol. Chem.* 259:11208-11214.
- 29) Campbell, C. and **Stanley, P.** (1984) A Dominant Mutation to Ricin-Resistance in CHO Cells Induces UDP-GlcNAc Glycopeptide N-Acetyl-glucosaminyltransferase III Activity. *J. Biol. Chem.*, 261:13370-13378.
- 30) Deutscher, S.L., Nuwayid, N., **Stanley, P.** and Hirschberg, C.B. (1984) Translocation across Golgi membranes. A CHO glycosylation mutant deficient in CMP-sialic acid transport. *Cell* 39:295-299.
- 31) **Stanley, P.** (1985) Membrane Mutants of Animal Cells: Rapid Identification of Those with a Primary Defect in Glycosylation. *Molec. Cell. Biol.* 5:923-929.

- 32) **Stanley, P.** and Chaney W. (1985) Control of Carbohydrate Processing: The *lec1A* CHO Mutation Results in Partial Loss of *N*-Acetylglucosaminyltransferase I Activity. *Molec. Cell. Biol.* 5:1204-1211.
- 33) Ripka, J. and **Stanley, P.** (1986) Lectin-Resistant CHO Cells: Selection of Four New Pea Lectin-Resistant Phenotypes. *Som. Cell Molec. Genet.* 12:51-62.
- 34) Ripka, J., Shin, S-I. and **Stanley, P.** (1986) Decreased Tumorigenicity Correlates With expression of Altered Carbohydrates in Lec9 CHO Cells. *Mol. Cell. Biol.* 6:1268-1275.
- 35) Chaney, W.G., Howard, D.R., Pollard, J.W., Sallustio, S. and **Stanley, P.** (1986) High-Frequency Transfection of CHO Cells Using Polybrene. *Som. Cell. Molec. Genet.* 12:237-244.
- 36) Chaney, W. and **Stanley, P.** (1986) Lec1A Chinese Hamster Ovary Cell Mutants Appear to Arise From a Structural Alteration in *N*-acetyl-glucosaminyltransferase I. *J. Biol. Chem.* 261:10551-10557.
- 37) Ripka, J., Adamany, A. and **Stanley, P.** (1986) Two Chinese Hamster Ovary Glycosylation Mutants Affected in the Conversion of GDP-mannose to GDP-fucose. *Arch. Biochem. Biosphys.* 249:533-545.
- 38) Howard, D., Fukuda, M., Fukuda, M.N., and **Stanley, P.** (1987) The GDP-fucose: *N*-acetylglucosaminide 3- α -Fucosyltransferases of LEC11 and LEC12 Chinese Hamster ovary Mutants Exhibit Novel Specificities for Glycolipid Substrates. *J. Biol. Chem.* 262:16830-16837.
- 39) **Stanley, P.** and Atkinson, P.H. (1988) The LEC11 Chinese Hamster Ovary Mutant Synthesizes *N*-Linked Carbohydrates Containing Sialylated, Fucosylated Lactosamine Units. Analysis by One- and Two-Dimensional ¹H NMR Spectroscopy. *J. Biol. Chem.*, 263:11374-11381. Erratum (1988) 263, 17203.
- 40) **Stanley, P.** (1989) Chinese Hamster Ovary Cell Mutants with Multiple Glycosylation Defects for the Production of Glycoproteins with Minimal Carbohydrate Heterogeneity. *Mol. Cell. Biol.* 9:377-383.
- 41) Rosenwald, A., **Stanley, P.** and Krag, S. (1989) Control of Carbohydrate Processing. Increased β 1,6-Branching in the *N*-linked Carbohydrates of Lec9 CHO Mutants Appears to Arise from a Defect in Oligosaccharide-Dolichol Synthesis. *Mol. Cell. Biol.* 9:914-924.
- 42) Sallustio, S. and **Stanley, P.** (1989) Novel Genetic Instability Associated with a Developmentally Regulated Glycosyltransferase Locus in Chinese Hamster Ovary Cells. *Som. Cell Mol. Genet.* 15:387-400.
- 43) Ravdin, J.I., **Stanley, P.**, Murphy, C.F., and Petri, W.A. Jr. (1989) Characterization of Cell Surface Carbohydrate Receptors for *Entamoeba histolytica* Adherence lectin. *Infection and Immunity.* 57:2179-2186.

- 44) Chaney, W., Sundaram, S., Friedman, N. and **Stanley, P.** (1989) The Lec4A CHO Glycosylation Mutant Arises from Miscompartmentalization of a Golgi Glycosyltransferase. *J. Cell Biol.* 109:2089-2096.
- 45) Kumar, R. and **Stanley, P.** (1989) Transfection of a Human Gene that Corrects the Lec1 Glycosylation Defect. Evidence for Transfer of the Structural Gene for *N*-acetylglucosaminyltransferase 1. *Mol. Cell Biol.* 9:5713-5717. (Erratum 10:3857, 1990).
- 46) Sallustio, S. and **Stanley, P.** (1990) Isolation of Chinese Hamster Ovary Mutants Differentially Resistant to Ricin, Abrin and Modeccin. *J. Biol. Chem.* 265:582-588.
- 47) Potvin, B., Kumar, R., Howard, D.R., and **Stanley, P.** (1990) Transfection of a Human $\alpha(1,3)$ Fucosyltransferase Gene into Chinese Hamster Ovary cells. Complications arise from Activation of Endogenous $\alpha(1,3)$ Fucosyltransferases. *J. Biol. Chem.* 265:1615-1622.
- 48) **Stanley, P.**, Sallustio, S., Krag, S. and Dunn, B. (1990) Lectin-Resistant CHO Cells. Selection of Seven New Glycosylation Mutants Resistant to Ricin. *Som. Cell Molec. Genet.* 16, 211-223.
- 49) Kumar, R., Yang, J., Larsen, R.D. and **Stanley, P.** (1990) Cloning and expression of *N*-acetylglucosaminyltransferase I - the Medial Golgi transferase that initiates complex *N*-linked carbohydrate formation. *Proc. Natl. Acad. Sci. USA* 87, 9948-9952.
- 50) **Stanley, P.**, Sundaram, S. and Sallustio, S. (1991) A subclass of cell surface carbohydrates revealed by a CHO mutant with two glycosylation mutations. *Glycobiology*, 1, 307-314.
- 51) Kumar, R., Potvin, B., Muller, W. A. and **Stanley, P.** (1991) Cloning of a human $\alpha(1,3)$ Fucosyltransferase gene that encodes ELFT but does not confer ELAM-1 binding on CHO cell transfectants. *J. Biol. Chem.* 266, 21777-21783.
- 52) Ray, M., Yang, J., Sundaram, S. and **Stanley, P.** (1991) A Novel Glycosylation Phenotype Expressed by Lec23, a CHO Mutant Deficient in α -Glucosidase I. *J. Biol. Chem.* 266, 22818-22825.
- 53) Potvin, B. and **Stanley, P.** (1991) 5-Azacytidine induces expression of two, apparently novel $\alpha(1,3)$ fucosyltransferase activities in CHO cells. *Cell Regulation*, 2, 989-1000.
- 54) Kumar, R., Yang, J., Eddy, R.L., Byers, M.G., Shows, T.B., and **Stanley, P.** (1992) Cloning and expression of the murine gene and chromosomal location of the human gene encoding *N*-acetylglucosaminyltransferase I. *Glycobiology*, 2, 383-393.(Erratum: ibid 9 (8) ix (1999)).
- 55) Rosenwald, A.G., **Stanley, P.**, McLachlan, K. R. and Krag, S. S. (1993) Mutants in Dolichol Synthesis: Polymenol reductase appears to be a rate-limiting step in the synthesis of dolichol. *Glycobiology*, 3, 481-488.

- 56) Goelz, S., Kumar, R., Potvin, B., Sundaram, S., Brickelmaier, M. and **Stanley, P.** (1994) Differential expression of an E-Selectin ligand (SLe^x) by two CHO cell lines transfected with the same $\alpha(1,3)$ Fucosyltransferase gene (ELFT). *J. Biol. Chem.*, 269, 1033-1040.
- 57) Ioffe, E. and **Stanley, P.** (1994) Mice lacking *N*-acetylglucosaminyltransferase I activity die at mid-gestation revealing an essential role for complex or hybrid *N*-linked carbohydrates. *Proc. Natl. Acad. Sci. USA*, 91, 728-732.
- 58) Yang, J., Bhaumik, M., Liu, Y. and **Stanley, P.** (1994) Regulation of *N*-linked glycosylation. Neuronal cell-specific expression of a 5' extended transcript from the gene encoding *N*-acetylglucosaminyltransferase I. *Glycobiology*, 4, 703-712.(Erratum: *ibid*, 5, 279, 1995)
- 59) Bhaumik, M., Seldin, M. F. and **Stanley, P.** (1995) Cloning and chromosomal mapping of the mouse *Mgat3* gene encoding *N*-acetylglucosaminyltransferase III. *Gene*, 164, 295-300.
- 60) Ioffe, E., Liu, Y., Bhaumik, M., Poirier, F., Factor, S. and **Stanley, P.** (1995) WW6: An embryonic stem cell line with an inert genetic marker that can be traced in chimeras. *Proc. Natl. Acad. Sci. USA*, 92, 7357-7361.
- 61) Stockert, R. J., Potvin, B., Tao, L., **Stanley, P.** and Wolkoff, A. W. (1995) Human hepatoma cell mutant defective in cell surface protein trafficking. *J. Biol. Chem.*, 270, 16107-16113.
- 62) Raju, T.S., Ray, M.K. and **Stanley, P.** (1995) LEC18: A dominant CHO glycosylation mutant synthesizes *N*-linked carbohydrates with a novel core structure. *J. Biol. Chem.*, 270, 30294-30302.
- 63) Potvin, B., Raju, T. S. and **Stanley, P.** (1995) *lec32*: A new mutation in Chinese Hamster ovary cells that essentially abrogates CMP-*N*-Acetylneuraminic acid synthetase activity. *J. Biol. Chem.*, 270, 30415-30421.
- 64) Raju, T. S. and **Stanley, P.** (1996) LEC14: A dominant CHO glycosylation mutant expresses complex *N*-glycans with a new *N*-Acetylglucosamine residue in the core region. *J. Biol. Chem.*, 271, 7484-7493.
- 65) Ioffe, E., Liu, Y. and **Stanley, P.** (1996) Essential role for *N*-glycans in forming an organized layer of bronchial epithelium, *Proc. Natl. Acad. Sci. U.S.A.*, 93, 11041-11046.
- 66) Weinstein, J., Sundaram, S., Wang, X., Delgado, D., Basu, R. and **Stanley, P.** (1996) A point mutation mislocalizes GlcNAc-TV in the Lec4A CHO glycosylation mutant, *J. Biol. Chem.* 271, 27462-27469.
- 67) Gupta, D., Oscarson, S., Raju, T. S., **Stanley P.**, Toone, E.J., and Brewer C.F. (1996) A comparison of the fine saccharide-binding specificity of Dioclea grandiflora lectin and concanavalin A, *Eur. J. Biochem.* 242, 320-326.

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- 69) Raju, S. T. and **Stanley, P.** (1998) Gain-of-function CHO Mutants LEC18 and LEC14 Each Express a Novel *N*-acetylglucosaminyltransferase Activity. *J. Biol. Chem*, 273, 14090-14098.
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- 71) Munster, A.K., Eckhardt, M., Potvin, B., Muhlenhoff, M., **Stanley, P.**, Gerardy-Schahn, R. (1998) Mammalian CMP-N-Acetylneuraminic Acid Synthetase: A Nuclear Protein with Evolutionary Conserved Structural Motifs. *Proc. Natl. Acad. Sci. U S A* 95:9140-9145.
- 72) Zhang, A., Potvin, B., Zaiman, A., Chen, W., Kumar, R., Phillips, L. and **Stanley, P.** (1999). The Gain-of-Function CHO Mutant LEC11B Expresses One of Two Chinese Hamster FUT6 Genes Due to the Loss of a Negative Regulatory Factor. *J. Biol. Chem.*, 274:10439-10450.
- 73) Bhaumik, M., Muller V. J., Rozaklis, T., Johnson, L., Dobrenis, K., Bhattacharyya, R., Wurzelmann, S., Finamore, P., Hopwood, J.J., Walkley, S.U. and **Stanley, P.** (1999) A mouse model for mucopolysaccharidosis Type III A (Sanfilippo Syndrome). *Glycobiology*, 9, 1389-1396.
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- 76) Moloney, D. J., Panin, V. M., Johnston, S. H., Chen, J., Shao, L., Wilson, R., Wang, Y., **Stanley, P.**, [^]Irvine, K. D., [^]Haltiwanger, R. S. and [^]Vogt, T. F. (2000) Fringe is a Glycosyltransferase that Modifies Notch. *Nature*, 406, 369-375.
[^]Corresponding authors
***Reviewed in Nature News and Views: Nature 406, 357-358**
- 77) Shi X, Potvin B, Huang T, Hilgard P, Spray D. C, Suadicani S. O, Wolkoff A. W, **Stanley P**, Stockert RJ (2001) A novel casein kinase 2 α subunit regulates membrane protein traffic in the human hepatoma cell line HuH-7. *J. Biol. Chem.*, 276, 2075-2082.
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79) Lee, J-H, Sundaram, S. Shaper, N. L. Raju, T. S. and **Stanley, P.** (2001) CHO Cells May Express Six β 4Galactosyltransferases. Consequences of the Loss of Functional β 4GalT-1, β 4GalT-6 or Both in CHO Glycosylation Mutants. *J. Biol. Chem.*, 276, 13924-13934.

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81) Cao, Z., Zhao, Z., Mohan, R., Alroy, J., **Stanley, P.** and Panjwani N. (2001) Role of the Lewisx glycan determinant in corneal epithelial cell adhesion and differentiation. *J. Biol. Chem.*, 276, 21714-21723.

82) Chen, W., Unligil, U. M, Rini, J. M. and **Stanley, P.** (2001) Independent Lec1A mutants arise from point mutations in N-acetylglucosaminyltransferase I that reduce affinity for both substrates. Molecular consequences based on the crystal structure of GlcNAc-TI. *Biochemistry*, 40, 8765-8672.

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***Recommended by Faculty of 1000**

84) Chen, J., Moloney, D. J. and **Stanley, P.** (2001) Fringe modulation of Jagged1-induced Notch signaling requires the action of β 4Galactosyltransferase-1. *Proc. Natl. Acad. Sci. USA*, 98, 13716-13721.

85) Bhattacharyya, R., Bhaumik, M., Raju T. S. and **Stanley, P.** (2002) Truncated, Inactive N-acetylglucosaminyltransferase III (GlcNAc-TIII) Induces Neurological and Other Traits Absent from Mice that Lack GlcNAc-TIII *J. Biol. Chem.*, 277, 26300-26309.

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88) Shi, S. and **Stanley, P.** (2003) Protein O-Fucosyltransferase 1 is an Essential Component of Notch Signaling Pathways. *Proc. Natl. Acad. Sci.*, 100, 5234-5239.

***Recommended by Faculty of 1000**

89) Lee, J, Park, S-H, and **Stanley, P.** (2003) Antibodies that Recognize Bisected Complex N-Glycans on Cell Surface Glycoproteins Can Be Made in Mice Lacking N-acetylglucosaminyltransferase III. *Glycoconj. J.*, 19, 211-219.

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5) Schnaar RL, Suzuki A, **Stanley P.** (2009) [Glycosphingolipids](#). In: Varki A, Cummings RD, Esko JD, Freeze HH, Stanley P, Bertozzi CR, Hart GW, Etzler ME, editors. Essentials of Glycobiology. 2nd edition. Cold Spring Harbor (NY): Cold Spring Harbor Laboratory Press. Chapter 10.

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editors. Essentials of Glycobiology. 2nd edition. Cold Spring Harbor (NY): Cold Spring Harbor Laboratory Press. Chapter 13.

7) Esko J. D. and **Stanley, P.** (2009) Glycosylation Mutants of Cultured Cells. In: Varki A, Cummings RD, Esko JD, Freeze HH, Stanley P, Bertozzi CR, Hart GW, Etzler ME, editors. Essentials of Glycobiology. 2nd edition. Cold Spring Harbor (NY): Cold Spring Harbor Laboratory Press. Chapter 46.

8) Mulloy, B., Hart, G. W. and Stanley, P. (2009) Structural Analysis of Glycans. In: Varki A, Cummings RD, Esko JD, Freeze HH, Stanley P, Bertozzi CR, Hart GW, Etzler ME, editors. Essentials of Glycobiology. 2nd edition. Cold Spring Harbor (NY): Cold Spring Harbor Laboratory Press. Chapter 47.

Essentials of Glycobiology 3rd edition -- update of all above 2nd edition chapters (2015-2017)
-- online book at NCBI

Essentials of Glycobiology 3rd edition update of all chapters - ongoing; to be published online only (2022)

Funding

Active

Roles for Glycosylation in Notch Signaling

NIH RO1 GM-106417-11A1 (P. I. Stanley)

04/01/2001 – 03/31/22

Lectin Resistant Tumor Cells and Functional Glycomics

NIH RO1 GM-105399-29A1 (P.I.: Stanley)

07/01/8194 – 05/31/23

Royalty funds -- from licensing CHO cell glycosylation mutants to companies

Completed

NIH PO1 13330 (P.I.: Goldman)

07/31/9197 -06/30/22

Pamela Stanley was program leader of the Membrane Program and the Associate Director for laboratory research until late 2020 when Dr. Goldman became emeritus.

Roles for N-Glycans in Spermatogenesis

Mizutani award (P. I. Stanley)

03/01/13 – 02/28/14

Glycosylation Mutants of Mice and Animal Cells

NIH RO1 CA 30645 (P.I: Stanley)

04/01/81 - 11/30/11

Liver Cell Membrane Proteins: Expression and Function

NIH 5 P01 DK41918 (P.I.: Wolkoff)

12/01/1991-11/30/12

Pamela Stanley was PI of subproject 3

Consortium for Functional Glycomics

NIH 1U54 GM62116 (P. I.: James Paulson)

09/1/2001 – 08/31/11

Pamela Stanley was steering committee member, chair mouse committee, chair publications committee

Invited Lectures (from 2007)

2007

March 3-9	Gordon Conference on Glycobiology Invited chair
April 11	University of Georgia Invited seminar
June 9-15	Benzon Symposium Copenhagen Invited speaker
July 8-12	Third Molecular Immunology Conference Taiwan Invited speaker
July 15-20	International Glycoconjugate Organization Cairns, Australia Invited speaker
Dec 9-12	EMBO Workshop on Development & Glycobiology Lille, France Invited speaker

2008

Feb 11	Cancer Center, University of New Mexico Seminar
April 11	Glycobiology Symposium Emory University Invited speaker
April 13-18	Cell Culture Engineering XI Coolangubra, Australia Keynote speaker
May 17-20	GlycoT 2008 Invited/declined
Oct 1	University of Kansas Seminar
Oct 2	Sigma Chem Co. St Louis Seminar
Oct 30	SUNY Stony Brook Seminar
Nov 19th	R&D Systems Minneapolis Seminar

2009

- Jan 18-22 Gordon conference on Glycobiology
Invited speaker
- April 29 Texas A & M
Biochemistry and Molecular Biology Dept.
Seminar
- Sept 17 UT Southwestern
Dept. Biochem and Mol Biol
Seminar
- Sept 27-Oct 1 International meeting on Notch
Athens, Greece
Invited speaker
- Sept. 29 German Biochemical and Molecular Biology Society
"Signal Transduction and Disease"
Plenary speaker - declined
- Oct 16 Dept. Molecular Genetics
University of Toronto
Invited speaker

2010

- Feb 25 Bio21
University of Melbourne, Australia
Invited seminar
- Mar 16-19 Hunter Valley International Cell Biology meeting
Hunter Valley, NSW, Australia
Invited speaker
- Mar 31 Dept. Biochem.
Univ. Melbourne, Australia
Invited seminar
- May 17 Peter Mac Callum Cancer Inst.
Melbourne, Australia
Invited seminar
- Jun 23 BAAMBII postdoctoral association
Bio21. A career in science.
Invited seminar
- Sept 14 Goldstein lecture
Dept. Biol. Chem.
University of Michigan, Ann Arbor
Invited seminar
- Nov 7-10 Society for Glycobiology annual meeting
Invited chair and speaker
- Nov 10-12 Muscular Dystrophy meeting
Charlotte, Virginia
Invited speaker

2011

- Feb 17 Cell Lablinks
Columbia University, NY

	Invited speaker
Mar 7-10	Keystone Meeting Glycoimmunology Chair and speaker
Mar 14,15	CFG meeting CCRC Georgia CFG steering committee
Mar 28	Case Western Reserve Dept. Pathology (Lan Zhou) Seminar
April 8	University Wyoming Dept. Biochemistry (Don Jarvis) Seminar
May 6-13	Gordon Conference on Glycobiology Chair session
June 13	University of Toronto, HSK Dept. Biochemistry (Harry Schachter) Seminar
June 29	Upstate Medical University Dept. Neuroscience (Huaiyu Hu) Seminar
Aug 21-26	Glyco XXI meeting IGO, Vienna, Austria Plenary speaker
Oct 17	Louisiana State University Dept. Biochemistry & Chemistry (Roger Laine) Seminar
Nov 17	Biogen IDEC, Cambridge (Brian Majors) Seminar

2012

Feb 12,13	National Academy of Sciences Workshop on the future of the Glycosciences Speaker
Jun 5-9	GlycoT 2012, Hanover, Germany Speaker
Aug 12-17	First Gordon Conference on Notch Speaker
Oct 1-5	Peter Gallagher Memorial Lecture Griffith University, God Coast Australia
Nov 11-14	ASMB and Soc for Glycobiology meeting Speaker

2013

April 20-24	ASBMB Annual Meeting Theme Organizer, Session Chair and Speaker
Sept 17-19	International meeting on The Golgi Bad Ischl, Austria Invited speaker

2014

Feb 3	Horwitz Faculty Prize Lecture Albert Einstein College Medicine
July 20-24	Notch Gordon Conference, Maine Invited speaker
Oct 30	Bio21, Dept Biochemistry, Australia Invited speaker

2015

April 20-21	Jenner Symposium Institute Curie, Paris, Plenary speaker
May 6	WALS lecture, NIH Invited by Larry Tabak and Kelley Ten Hagen
May 11	Depts. Pathology and Cell Biology, Columbia Physicians and Surgeons Invited speaker
Sept 13-19	International Glycoconjugate Organization, Croatia Keynote speaker selected by the Society for Glycobiology
Dec 8	Biofrontiers. Colorado Invited speaker

2016

April 8	MICC-4 Taiwan Invited speaker and chair
April 22	Cancer Workshop, Cuba Invited speaker
May 6-8	GlycoT meeting Toronto Invited speaker and organizer
Oct 28	EMBO Workshop on the Golgi Organizer and invited speaker

2017

Feb 24-28	11 th ICSM Symposium, Mohali India Invited speaker
Mar 19-24	Gordon conference on Glycobiology Keynote speaker
Apr 21	Biochemistry/Chemistry Baylor Waco Invited seminar
May 3	Brody Cancer Center, East Carolina University Invited seminar
May 15	Einstein Cancer Center Retreat Invited speaker

2018

Jul 19	Gordon Conference Notch Signaling GRS; Keynote speaker Gordon Conference Notch Signaling; Chair session
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Oct 15 EMBO Workshop on Trafficking
Sorrento, Italy. Invited speaker

Nov 4 Society for Glycobiology, satellite meeting
New Orleans USA. Invited speaker

2019

Feb 7 Dept Pharmacology (Lakshmi Devi)
Mt Sinai NY Invited speaker

Mar 11-15 Gordon Conf Glycobiology, Italy
Invited speaker
Declined

Apr 12 Univ Illinois (Jan Kitajewski)
Invited speaker

Oct 6 Notch meeting, Athens
Invited speaker

Nov 5 Glycobiology meeting, New Orleans
Invited speaker and session Chair

Nov 11 Nobel Academy Sciences, Sweden
1-day meeting, Declined

2020

Apr 20 Cell Biology Faculty seminar -- ABO blood groups & Covid-19

Jun 22 GlycoT 2020 (Boston virtual)
Invited speaker

Aug 20 Einstein Internal Faculty Seminar
Covid-19 - roles for glycans

2021

Apr 28 ASBMB meeting at Experimental Biology (virtual)
Invited speaker

2022

Jun 16 9th International Symposium on ALGS, the Alagille Syndrome Alliance
Invited speaker

Nov 16 Symposium on Glycobiology
University of Buenos Aires
Invited speaker

Teaching (yearly):

Medical School entering class

Virology (4) 1978 – 1986
Origins of Cancer (3) 1987 – 1992

Election to Leo M. Davidoff Society for excellence in medical school teaching (1987)

Teaching of formal courses in the medical school ceased when the curriculum was changed and incoming faculty needed teaching experience.

Graduate School (Lectures)

Biochemistry (4) 1980 - 2008
Cell Biology (2) 1984 - 2008
Membranes (10) 1978 – 1984
Biochemistry II (2) 2002 - 2008
Glycobiology (15) 1992 - depending on demand

LaDonne Shulman award for excellence in graduate school teaching (2009)

Formal teaching in the graduate school ceased when the curriculum in the graduate school was changed to reduce the number of formal lectures, and/or new junior faculty needed teaching experience.

EINSTEIN COMMITTEES (2021)

Senate
Senate Council (elected)
Senate committee on Faculty Interactions (Chair)
Senate Faculty Review Committee (Chair)
Einstein Communications Committee
MSTP steering committee
Cell Biology Dept.—Organize weekly work-in-progress
Grad student advisory committee (1)
Ph. D. thesis committee (1)

Einstein Committees in years prior:

Cancer Center Steering Committee
Cancer Center Executive Committee
Cancer Center Program Leader of Membrane Molecular Biology
Senate
Senate Council (elected)
Cell & Molecular Biology & Genetics training program, chair steering committee
MSTP steering committee
Patent review committee
Campus Master Plan committee
Organize off-campus retreats (6, 1.5 day for Cell Biology; 10, 1 day for CMBG training grant)
CERC search committee
Grad student advisory committees (3-6 per year)
Ph. D. thesis committees (1-3 per year)
Search committee for Dean (2006 and 2016)
Search committee for Cancer Center Director (2019-2020)
Chair search committee for chair of Genetics (2006)

Vice-chair and Chair promotion committee to Associate Professor (1986)
Vice-chair and Chair promotion committee to Professor
Chair of awards nomination committee
Tenure review committee
Tenure policy committees

PRE-DOCTORAL SCHOLARS

NAME	PERIOD OF STAY	POSTDOCTORAL/CURRENT POSITION	CURRENT AFFILIATION
James Ripka	1980-1986	Dr. Michael Pierce Dept of Biochemistry University of Miami	Science teacher, High school, Long Island (Outstanding LI teacher award)
Daniel Howard	1984 -1988	Physician	University of Maryland Health Center Baltimore, MD
Sandra Sallustio	1984-1990	Dr. Marcia Goldberg AECOM, Dept. of M & I	Assistant Prof. Emergency Medicine, Mt. Sinai Medical Center, New York
Jing Yang	1988-1993	Dr. Bruce Furie Div. of Hematology- Oncology, New England Medical Center, Tufts University, Boston	Global Lead, Pan Asian Network, Bristol Myers Squibb, Ambler, PA
Ella Ioffe	1991-1995	Dr. Jeffrey Friedman Rockefeller University	Director, Regeneron Pharmaceuticals Inc., New York, NY
Aimin Zhang	1991-1998	Dr. Raju Kucherlapati Dept. Molecular Genetics Albert Einstein	Information specialist. New York
Wei Chen	1995 -2001	Dr. Robert Roeder, Rockefeller University	Senior Director Gene Regulation and Metabolism at Equilibre BioPharmaceuticals, New York, NY
Xiaoping Yang	1996 -2002	Research Assoc. University Pennsylvania (Lewis Chodos)	Unknown
Santosh Patnaik	1997 – 2003	Research Assoc. University of Buffalo, Dept. Surgery Buffalo, New York	Assistant Professor Oncology, Roswell Park Cancer Center, Buffalo, NY
Jihua Chen	1998 – 2003	Research Assoc. Dana Faber, Boston (James Griffin)	Senior Staff Scientist, Regeneron Pharmaceuticals, New York, NY

Mark Stahl	2002-2007	Resident, UCLA Health Los Angeles	Senior Medical Director, Avidity Biosciences Inc., San Diego
Linchao Lu	2003 -2010	Postdoctoral Fellow, Pediatrics- Hematology/Oncology Baylor College of Medicine (Lisa Wang)	Instructor, Pediatrics- Hematology/Oncology Baylor College of Medicine.
Huang-Hsiang Huang	2003 -2010	Postdoctoral Fellow Caltech, Pasadena (Linda Hsieh-Wilson)	Medical graduate, Taiwan

POST DOCTORAL SCHOLARS

NAME	PERIOD OF STAY	GRADUATE INSTITUTION	CURRENT AFFILIATION
Petr Draber	1980-1982	RNDr degree Charles University Czech Republic	Professor, former HHMI Investigator, Laboratory of Signal Transduction, Institute of Molecular Genetics, Czech Academy of Sciences.
Christine Campbell	1980-1983	Ph.D. University of Toronto, Canada	Assist. Prof. Dept. Biochemistry, SUNY Buffalo
William Chaney	1983- 1987	Ph.D., Michigan State University	Professor, Biochemistry and Molecular Biology and Eppley Institute, University of Nebraska Medical School
Ravindra Kumar	1987- 1992	Ph.D., University of New Brunswick, Canada	Senior VP and Chief Scientific Officer, Acceleron Pharma, Boston, MA
Manas Ray	1988- 1993	Ph.D., University of Calcutta, India	Head, Analytical Sciences at Evelo Biosciences, Cambridge, MA
Y. Liu	1992-1995	M.D., Nanjing Medical College, China	Medical Practitioner

T. Shantha Raju	1992-1996	Ph.D. University of Mysore, India	VP and Head of Protein Sciences, CHO Plus Inc., San Francisco, CA
Mantu Bhaumik	1992- 1997	Ph.D., Jadavpur University, India	Assistant Prof., Manager, Gene Manipulation & Genome Editing Core, Neurobiology Center, Boston Children's Hospital
X. Zhang	1995- 1996	Ph.D., Peking Union Medical College	Research Associate Mt. Sinai School of Medicine
Jaehoon Lee	1996-2000	Ph.D., University of Florida	Principal Associate, Dept. Medicine and Cell Biology, Albert Einstein College of Medicine
Riddhi Bhattacharya	1996-2000	Ph.D., University of Calcutta	Patent Agent, Sorell, Lenna & Schmidt, LLP, New York, NY
Jian Tang	1998-2001	Ph.D., Chinese Academy of Sciences	Scientist II, Marengo Therapeutics, Newton Center, MA

Shaolin Shi	1998-2004	Ph.D., Fudan University, China	Professor, National Clinical Research Center of Kidney Diseases, Jinling Hospital, Nanjing University School of Medicine, Nanjing, China.
Antti Seppo	2000-2001	Ph.D., University of Helsinki, Finland	Senior Director of Biology, Ikonysis, New Haven, CT
Sung-Hae Park	2000-2001	Ph.D., University of Washington, Seattle	Distinguished Scientist, Head Protein Engineering, Sanofi, US Biologics Research, Cambridge, MA
Daniel J. Moloney	2000-2002	Ph.D., SUNY at Stony Brook	Research Associate Professor Program Director, NIH - Bridges to the Baccalaureate "BioPREP" Director, Biotechnology Teaching Laboratory, Stony Brook University. NY

Suzannah Williams	2002-2007	Ph. D. University of London, England	Principle Investigator, Group Leader, Dept. Women's and Reproductive Health, University of Oxford, England.
Changhui Ge	2002-2007	Ph. D. Dalian Medical University, China	Scientist, Beijing Institute of Radiation Medicine, Beijing, 100850, P.R.China
Yeongjin Hong	2001-2002	Ph. D. Osaka University Japan	Professor, Dept. Microbiology Chonnam National Uni Med School, Chonnam, Korea
Kazuhide Uemura	2002-2004	Ph. D. Kyoto University Japan	Associate Professor, Dept. Clin Pharm & Therapeutics, University of Shizuoka, Japan
Yinghui Song	2003-2011	Ph. D. Peking Union Med College, China	Associate, Dept. Genetics, Albert Einstein College Medicine
Tongyi Liu	2005-2006	MD Shanghai Second Medical University	Scientist, Chengdu Jingyuan Bio-Science & Technology Co., Ltd. Chengdu, China.
Santosh Patnaik	2004-2006	MD All India Institute PhD Albert Einstein College Medicine	Assistant Prof., Roswell Park Cancer Center, Buffalo, New York.
Reto Muller	2005-2012	Ph.D. ETH Zurich, Switzerland	Senior Scientist, Miltenyi Biotech, Brookline, MA
Xinghua Hou	2005-2009	Ph. D. Gunma University, Japan	Scientist, Merck, China
Jennifer Aguilan	2005-2011	Ph. D. University of Manila, Philippines	Principal Associate, Dept. Biochemistry Albert Einstein College Medicine, New York
Jason A. Aglipay	2006-2008	Ph. D. Mt. Sinai/NYU, New York	Unknown

Yuko Tashima	2007-2012	Ph. D. Osaka University, Osaka, Japan	Research Assistant Prof., Department of Molecular Biochemistry, Nagoya University Graduate School of Medicine, Nagoya, Japan
Yinghui Liu	2007-2008	Ph. D. Syracuse University, New York	Project Director BGI-Shenzhen, Shenzhen, China
Frank Batista	2008-2014	Ph. D. with Honors, Denis Diderot University, Paris.	Res Scientist, Dept. Biochemistry and Molecular Biology, University of Debrecen, Hungary
Ju Qiu	2009-2009	Ph. D. Shanghai Institute of Immunology, Shanghai	Principal Investigator, Institute of Health Sciences, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences and Shanghai Jiao Tong University School of Medicine, Shanghai, China.
Fei Yuan	2008-2015	Ph. D. Dept. Cell Biology and Genetics, College of Life Sciences, Peking University, Beijing (P.R. China)	Lab Manager, CAS Key Laboratory of Pathogenic Microbiology and Immunology Institute of Microbiology, CAS Beijing, China
Hua-Xing Wei	2009-2014	Ph. D. University of Science and Technology, Heifei	Maternity leave
Hazuki Miwa	2009-2013	Ph. D. Case Western Reserve, Cleveland, Ohio, USA	Education specialist FAES at NIH, Bethesda, MD
Huang-Hsiang Huang	2010-2011	Ph. D. Dept. Cell Biology Albert Einstein	Medical graduate, Taiwan
Linchao Lu	2010 - 2011	Ph. D. Dept. Cell Biology Albert Einstein	Instructor, Pediatrics-Hematology/Oncology Baylor College of Medicine.

Jillian Prendergast	2013 - 2014	Ph. D. Johns Hopkins Medical School, Baltimore	Principal Scientist, Palleon Pharmaceuticals, Boston, MA
Shweta Varshney	2013 - 2018	Ph. D. SUNY Downstate, Brooklyn, NY	Scientist, SPARK Therapeutics, Inc., Philadelphia, PA
Barnali Biswas	2013 – 2018	Ph. D. Dept. Animal Sciences, University of Hyserabad, India	Assistant Professor, National Institute for Research in Reproductive Health, Mumbai, India
Vivek Kumar	2014 - 2017	Ph. D. Dept. Molec. Med. LaSapienza University, Rome, Italy	Junior Principle Investigator, Shanghai Proton and Heavy Ion Center, Shanghai, China
Meng Liang	2015 - 2016	Ph. D. University of Science and Technology of China (USTC)	Assistant Prof. Department of Life Science, Bengbu Medical College, Bengbu, China.
Ayodele Akintayo	2016 – 2019	Ph. D. Laval University Quebec, Canada	Scientist, Museum laboratory, Bonn, Germany
Ankit Tanwar	2018 –	Ph. D. Jamia Hamdard INMAS, New Delhi, India	
Mohd Nauman	2018 -	Ph. D. School Life Sciences, Jawaharlal Nehru University, New Delhi, India	
Afsana Sabrin	2019 - 2021	Ph. D. Dept. Chemistry, University of Louisiana, Baton Rouge, LA	Postdoctoral fellow, Dept Neuroscience, Columbia University, NY
Mingxin Shi	2019 - 2021	Ph. D. University of Chicago Carbondale	Postdoctoral Fellow, University Oregon, Pullman, OR
Pratima Saini	2021 -	Ph. D. National Institute of Immunology, New Delhi, India	
Mohd Shamoon Asmat	2021 -	Ph. D. Dept. Biochemistry, Aligarh Muslim University, India	

VISITING SCIENTISTS

NAME	PERIOD OF STAY	CURRENT POSITION
Barry Potvin, Ph.D.	1987 - 2017	Professor Emeritus, Department of Biology Yeshiva University, New York, NY
Olga Blumenfeld, Ph.D.	1995 - 1997	Deceased
Noorjahan Panjwani, Ph.D.	1997 - 1998	Professor, Departments of Biochemistry and Ophthalmology, Tufts University. School of Medicine, Boston, MA
Masahiro Asada, Ph.D.	1999 - 2000	Senior Research Scientist, AIST National Institute of Human Bioscience and Technology, Japan