

BIOGRAPHICAL SKETCH

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NAME John Euster Golin		POSITION TITLE Professor Emeritus of Biology, The Catholic University of America Adjunct Professor of Biology, Yeshiva University	
eRA COMMONS USER NAME			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Haverford College, Haverford, Pennsylvania	B.A. (honors)	1973	Molecular Biology
University of Chicago, Chicago, Illinois	Ph.D.	1979	Genetics
University of Oregon, Eugene, Oregon	Postdoctoral	1979-1983	Genetics

A. Personal Statement:

I was on the faculty of The Catholic University of America for 35 years where I balanced high quality teaching and research. The Department of Biology at CUA has undergraduate and graduate programs in biology. The Department is small, but all the faculty center their research in the area of cellular and molecular biology, so it is a cohesive group. We could easily discuss our research with each other. I also had strong collaborations at the nearby NIH with Dr. Suresh Ambudkar, a highly regarded biochemist working with ABC transporters and with Lutz Schmitt, a structural biochemist in Germany. Compared to my collaborators and other researchers in the field, I carried a heavy teaching load of three courses per year. Partly for this reason, I limited the size of my research group (typically 3-4 undergraduate and 3-4 graduate students at any one time) so that I could mentor all of them and conduct experiments myself. My major goal was to combine effective teaching and research. Over the years, I mentored over 150 undergraduates. A large majority of these have gone on to successful careers in medicine and science.

Eighteen students received Ph.Ds. and six students received Masters degrees under my supervision. Although my output of 40 papers is small by most standards, they have been cited over 2000 times and I am the first or last author on all but six of these. Four research papers have accumulated over 175 citations and four over 70. Our work on the transmission interface of the Pdr5 transporter was described in print as elegant. My research is regarded as rigorous and novel.

I retired from Catholic University in August 2020 and relocated to New York City. In 2020, I accepted a position as Adjunct Professor of Biology at Yeshiva University. I am Professor Emeritus of Biology at CUA.

B. Appointments and Awards:

1983-1985: Visiting Scientist, E.I.DuPont and Co., Wilmington, Delaware

2001-2018: Special volunteer, Laboratory of Cell Biology (Transport Biochemistry Unit), NIH/NCI, Bethesda, MD

2000: Awarded the James Dornan Memorial Teacher of the Year, The Catholic University of America

1994-2000: Member, Microbial Genetics and Nucleic Acid Panel, NSF

1996-present: Professor of Biology, The Catholic University of America

1990-1996: Associate Professor of Biology, The Catholic University of America

1985-1990: Assistant Professor, The Catholic University of America

2005-present: Member, American Chemical Society

2008-present: Member, American Society for Biochemistry and Molecular Biology

2011-2013 Member, Membrane Transport and Biophysics panel, NSF

2021- Editor, Frontiers in Microbiology

2020- Adjunct Professor of Biology, Stern College for Women, Yeshiva University

Funding (1989-2020)

Period	Agency	Title of proposal	Amount received
1989-1992	NIH, R-15	Analysis of a gene Smr3 conferring multiple drug resistance in yeast	\$125,000
1993-2001	NSF	Analysis of multiple drug resistance in yeast (renewed once)	\$424,454
2002-2005	NIH, R-15	Analysis of the role of the yeast UBP6-encoded hydrolase	\$133,630
2011-2015	NSF	How a yeast multidrug transporter improves its ability to expel xenobiotic compounds from cells	\$519,978
2006-2020	NIH, R-15	Molecular genetic analysis of Pdr5p, a major yeast multidrug transporter (renewed three times)	\$1,157,404
		Nine awards counting competitive renewals	\$2,360,466

Publications

A. Papers on mitotic recombination (1977-1994)

JE Golin, MS Esposito Evidence for joint genic control of spontaneous mutation and genetic recombination during mitosis in *Saccharomyces*. (1977) *Molecular and General Genetics* 150 (2), 127-135.

RE Malone, **JE Golin**, MS Esposito Mitotic versus meiotic recombination in *Saccharomyces cerevisiae*. (1980) *Current Genetics* 1 (3), 241-248

JE Golin, MS Esposito Mitotic recombination: Mismatch correction and replicational resolution of Holliday structures formed at the two-strand stage in *Saccharomyces*. (1981) *Molecular and General Genetics* 183 (2), 252-263

JE Golin, MS Esposito Coincident gene conversion during mitosis in *Saccharomyces*. (1984) *Genetics* 107 (3), 355-365.

MS Esposito, J Hosoda, **J Golin**, H Moise, K Bjornstad, D Maleas Recombination in *Saccharomyces cerevisiae*: REC-gene mutants and DNA-binding proteins. (1984) *Cold Spring Harbor Symposia on Quantitative Biology* 49, 41-48

JE Golin, SC Falco, JP Margolskee Coincident gene conversion events in yeast that involve a large insertion. (1986) *Genetics* 114 (4), 1081-1094

SC Falco, KS Dumas, RE McDevitt, **JE Golin** Molecular biology of sulfonyleurea herbicide action on *Saccharomyces cerevisiae*. (1987) *CRC Press*

JE Golin, SC Falco The behavior of insertions near a site of mitotic gene conversion in yeast. (1988) *Genetics* 119 (3), 535-540

JE Golin, H Tampe Coincident recombination during mitosis in *Saccharomyces*: distance-dependent and-independent components. (1988) *Genetics* 119 (3), 541-547

BL Wickes, **JE Golin**, KJ Kwon-Chung Chromosomal rearrangement in *Candida stellatoidea* results in a positive effect on phenotype. (1991) *Infection and immunity* 59 (5), 1762-1771

BD Bethke, **J Golin** Long-tract mitotic gene conversion in yeast: evidence for a triparental contribution during spontaneous recombination. (1994) *Genetics* 137 (2), 439-453

B. Papers on multiple drug resistance and the Pdr5 ABC multidrug transporter (1990-2023)

G Leppert, R McDevitt, SC Falco, TK Van Dyk, MB Ficke, **J Golin** Cloning by gene amplification of two loci conferring multiple drug resistance in *Saccharomyces*. (1990) *Genetics* 125 (1), 13-20

S Meyers, W Schauer, E Balzi, M Wagner, A Goffeau, **J Golin** Interaction of the yeast pleiotropic drug resistance genes *PDR1* and *PDR5*. (1992) *Current Genetics* 21 (6), 431-436

PJ Leonard, PK Rathod, **J Golin** Loss of function mutation in the yeast multiple drug resistance gene *PDR5* causes a reduction in chloramphenicol efflux. (1994) *Antimicrobial Agents and Chemotherapy* 38 (10), 2492-2494

DJ Katzmann, PE Burnett, **J Golin**, Y Mahé, WS Moye-Rowley Transcriptional control of the yeast *PDR5* gene by the *PDR3* gene product. (1994) *Molecular and Cellular Biology* 14 (7), 4653-4666

DJ Katzmann, TC Hallstrom, M Voet, W Wysock, **J Golin**, G Volckaert, WS Moye-Rowley Expression of an ATP-binding cassette transporter-encoding gene (*YOR1*) is required for oligomycin resistance in *Saccharomyces cerevisiae*. (1995) *Molecular and Cellular Biology* 15 (12), 6875-6883

TM McGuire, E Carvajal, D Katzmann, M Wagner, WS Moye-Rowley, A Goffeau, **J Golin** Analysis of second-site mutations that suppress the multiple drug resistance phenotype of the yeast *PDR1-7* allele. (1995) *Gene* 167 (1), 151-155

JM Shallom, **J Golin** The unusual inheritance of multidrug-resistance factors in *Saccharomyces*. (1996) *Current Genetics* 30 (3), 212-217

A Fleckenstein, J Shallom, **J Golin** A *PDR5*-independent pathway of multi-drug resistance regulated by the *SIN4* gene product. (1999) *Yeast* 15 (2), 133-137

J Golin, A Barkatt, S Cronin, G Eng, L May Chemical Specificity of the *PDR5* Multidrug Resistance Gene Product of *Saccharomyces cerevisiae* Based on Studies with Tri-n-Alkyltin Chlorides. (2000) *Antimicrobial Agents and Chemotherapy* 44 (1), 134-138

J Keeven, D Ko, J Shallom, B Uccellini, **J Golin** *PDR2* Gain-of-function mutations eliminate the need for *Pdr1* and require the *UBP6* product for resistance to translational inhibitors. (2002) *Current Genetics* 41 (1), 11-19

J Golin, SV Ambudkar, MM Gottesman, AD Habib, J Szczepanski, W Ziccardi, L May Studies with novel *Pdr5p* substrates demonstrate a strong size dependence for xenobiotic efflux. (2003) *Journal of Biological Chemistry* 278 (8), 5963-5969

L Hanson, L May, P Tuma, J Keeven, P Mehl, M Ferenz, SV Ambudkar, **J Golin** The role of hydrogen bond acceptor groups in the interaction of substrates with Pdr5p, a major yeast drug transporter. (2005) *Biochemistry* 44 (28), 9703-9713

CP De Thozée, S Cronin, A Goj, **J Golin**, M Ghislain Subcellular trafficking of the yeast plasma membrane ABC transporter, Pdr5, is impaired by a mutation in the N-terminal nucleotide-binding fold. (2007) *Molecular Microbiology* 63 (3), 811-825

J Golin, ZN Kon, CP Wu, J Martello, L Hanson, S Supernavage Complete inhibition of the Pdr5p multidrug efflux pump ATPase activity by its transport substrate clotrimazole suggests that GTP as well as ATP may be used as an energy source (2007) *Biochemistry* 46 (45), 13109-13119

J Golin, SV Ambudkar, L May The yeast Pdr5p multidrug transporter: how does it recognize so many substrates? (2007) *Biochemical and Biophysical Research Communications* 356 (1), 1-5 (invited review)

ZE Sauna, SS Bohn, R Rutledge, MP Dougherty, S Cronin, L May, D Xia, S V Ambudkar, **J Golin** Mutations Define Cross-talk between the N-terminal Nucleotide-binding Domain and Transmembrane Helix-2 of the Yeast Multidrug Transporter Pdr5 POSSIBLE CONSERVATION OF A SIGNALING INTERFACE FOR COUPLING ATP HYDROLYSIS TO DRUG TRANSPORT. (2008) *Journal of Biological Chemistry* 283 (50), 35010-35022

RM Rutledge, M Ghislain, JM Mullins, CP de Thozée, **J Golin** Pdr5-mediated multidrug resistance requires the CPY-vacuolar sorting protein Vps3: are xenobiotic compounds routed from the vacuole to plasma membrane transporters for efflux? (2008) *Molecular Genetics and Genomics* 279 (6), 573-583

N Ananthaswamy, R Rutledge, ZE Sauna, SV Ambudkar, E Dine, E Nelson, **J Golin** The signaling interface of the yeast multidrug transporter Pdr5 adopts a cis conformation, and there are functional overlap and equivalence of the deviant and canonical Q-loop. (2010) *Biochemistry* 49 (21), 4440-4449

MT Downes, J Mehla, N Ananthaswamy, A Wakschlag, M Lamonde E Dine, S V Ambudkar, **J. Golin** The transmission interface of the *Saccharomyces cerevisiae* multidrug transporter Pdr5: Val-656 located in intracellular loop 2 plays a major role in drug resistance. (2013) *Antimicrobial Agents and Chemotherapy* 57 (2), 1025-1034

C Furman, J Mehla, N Ananthaswamy, N Arya, B Kulesh, I Kovach, S V Ambudkar, **J Golin** The deviant ATP-binding site of the multidrug efflux pump Pdr5 plays an active role in the transport cycle. (2013) *Journal of Biological Chemistry* 288, 30420-30431

J Mehla, R Ernst, R Moore, A Wakschlag, MK Marquis, SV Ambudkar, **J Golin** Evidence for a molecular diode-based mechanism in a multispecific ATP-binding cassette (ABC) exporter: Ser-1368 as a gatekeeping residue in the yeast multidrug transporter Pdr5. (2014) *Journal of Biological Chemistry* 289 (38), 26597-26606

J Golin, SV Ambudkar The multidrug transporter Pdr5 on the 25th anniversary of its discovery: an important model for the study of asymmetric ABC transporters. (2015) *Biochemical Journal* 467 (3), 353-363 (invited review)

H Rahman, J Carneglia, M Lausten, M Robertello, J Choy, **J Golin** Robust, pleiotropic drug resistance 5 (Pdr5)-mediated multidrug resistance is vigorously maintained in *Saccharomyces cerevisiae* cells during glucose and nitrogen limitation. (2018) *FEMS yeast research* 18 (4) DOI: 10.1093/femsyr/foy029

Arya, N, H Rahman, A Rudrow, M Wagner, L Schmitt, SV Ambudkar, **J Golin** An A666G mutation in transmembrane-helix 5 of the yeast multidrug transporter Pdr5 increases drug efflux by enhancing cooperativity between transport sites. (2019) *Molecular Microbiology* 112, 1131-1144

H. Rahman, A Rudrow, J Carneglia, D Nicotera, J Choy, M Naldrett, S S P Joly, S V Ambudkar, **J Golin** Nonsynonymous Mutations in Linker-2 of the Pdr5 Multidrug Transporter Identify a New RNA Stability Element. (2020) *Genes, Genomes, Genetics (G3)* DOI: 10.1534/g3.119.400863

Banerjee, A H Rahman, R P Prasad and **J Golin** How fungal multidrug transporters mediate hyper resistance through DNA amplification and mutation. (2022) *Molecular Microbiology* DOI: 10.1111/mmi.14947

Alhumaidi, M, L-M Nentwig, H Rahman, L Schmitt, A Rudrow, A Harris, C Dillon, L Restrepo, E Lamping, N Arya, S V Ambudkar, J S Choy, **J Golin** Residues forming the gating regions of asymmetric multidrug transporter Pdr5 also play roles in conformational switching and protein folding. (2022) *Journal of Biological Chemistry* DOI.org/10.1016/j.jbc2022.102689

M Murakami, A Sajid, S Lusvarghi, S R Durell, B Abel, S Vahedi, **J Golin**, S V Ambudkar Second-site suppressor mutations reveal connection between the drug-binding pocket and nucleotide-binding domain 1 of human P-glycoprotein (ABCB1) (2023) *Drug Resist Updates* 71, 101009

J Golin, L Schmitt, Pdr5: a master of asymmetry (2023) *Drug Resist Updates* 71, 101010