Maria Diakonova, Ph.D.

CURRICULUM VITAE

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Education

1979-1982 Leningrad State University, USSR, Sc.B. in Biological Science

1982-1984 Leningrad State University, USSR, M.S. in Cell Biology, Diploma Title: "Changes in the cytoskeleton in malignant, nonmalignant cells and their hybrids"

1988-1993 Institute of Cytology Russian Academy of Science
Ph.D. in Cell Biology, Dissertation Title: "Internalization and intracellular sorting of growth factor receptors"

Positions

1984-1988 Institute of Cytology Russian Academy of Science, Staff in All-Union Cell Culture Collection.

In the Russian Academic system it is typical to work for several years between University and Ph.D. studies. The aim of the All-Union Cell Culture Collection was gathering, characterization, preservation, cryoconservation and distribution of cell lines. At that time the collection included about 100 animal and human cell lines. My duty was cultivation and preservation of all of them as well as monitoring cell quality (growth characteristics, cytogenetic analyses, microbiological control) and quantity (See Publications, #2). In addition I continued my investigation of cytoskeleton structure (See Publications, #1).

1988-1993 Graduate student, Institute of Cytology, Prof. Nikolsky and Dr. Sorkin, advisors.

In 1989 I was invited to join the Laboratory of Cell Cycle Physiology of the Institute of Cytology as a graduate student. This laboratory, headed by Prof. N. Nikolsky, studied EGF receptor endocytosis. The aim of my doctoral work was to study the internalization and intracellular sorting of growth factor receptors. (See Publications, #3 and #6). In collaboration with Dr. C.-H. Heldin (Ludwig Institute for Cancer Research,

Uppsala, Sweden) I studied the internalization of platelet-derived growth factor receptor (See Publication, #4).
1991 I worked for 6 months in the laboratory of Dr. Guillouzo in Rennes (France) to localize proteins in liver matrix with immunoelectron microscopy (See Publications, #5).
1992 I worked for 3 months with Dr. Boonstra (Univ. of Utrecht, the Netherlands). I studied the intracellular localization of phospholipase Cγ1 (PLCγ1) in A431 cells, using a combination of immunofluorescence, confocal microscopy as well as cryosectioning and freeze-substitution. (See Publications, #7).

1993-1995 Research Investigator, Institute of Cytology, Prof. Nikolsky, supervisor.
Returning to the Institute of Cytology, I continued my studies of intracellular distribution of PLCγ1. Together with Dimitry Chilov, a M.S. student under my supervision, I demonstrated that localization of PLCγ1 varies in cell lines with different levels of transformation (See Publications, #9).

2002 (9.01.2002) -now Research Assistant Professor, Department of Molecular and Integrative Physiology, University of Michigan Medical School

Postdoctoral Training
1995-1997 Postdoctoral fellow, Cell Biology Program, EMBL, Heidelberg, Germany, Dr. Griffiths, supervisor
At EMBL I studied the distribution of several annexins along the endocytic and phagocytic pathways. I designed a new assay for purification of phagosomes containing the IgG- and complement-bound latex beads at different stages of phagocytosis and tested them for the presence of annexins by immunoblotting and immunoelectron microscopy on cryosections (See Publications #10, 11).

1997-1999 Postdoctoral fellow, Department of Anatomy and Cell Biology, University of Michigan Medical School, Dr. Swanson, supervisor
I studied the involvement of signaling molecules and cytoskeletal elements in the early stages of phagocytosis. I developed a new assay for synchronizing phagocytosis in large populations of macrophages (see my scanning EM image of macrophages ingesting red blood cells during synchronized phagocytosis in "Trends in Cell Biology, 9, 1999, p.199 and in "The Cell. A molecular approach" G. M. Cooper, Second edition, ASM Press, 2000. p. 492). I quantified actin polymerization and measured the kinetics of association of specific phagosome-associated molecules (See Publication, #14).

1999-2002 Postdoctoral fellow, Department of Physiology, University of Michigan Medical School, Dr. Carter-Su, supervisor
I was involved in growth hormone (GH) research to understand the molecular mechanism by which GH causes physiological responses (See Publications #12,13). I have shown that SH2-Bβ (SH2-domain-contaning protein SH2-Bβ is a substrate of the GH receptor associated tyrosine kinase JAK2) is a novel Rac-binding component of the signaling network involved in regulation of cell motility (See Publication#15). I have discovered a new function of SH2-Bβ as actin-bundling protein. I have shown that SH2-Bβ is a critical component of VASP-dependent actin-rearrangement.

Currently I am studying a precise mechanism of SH2-Bβ action in actin-dependent motility using intracellular movement of *Listeria monocytogenes* as a model. Additionally, I study an implication of JAK2 kinase in a regulation of function of serine-threonine kinase PAK1.

Collaboration

Presently initiating collaborative effort with Dr. M.-F. Carlier, Laboratoire d'Enzymologie et Biochemie Structurales, Gif-sur-Yvette, France to study a role of SH2-Bβ in movement of *Listeria in vitro*.

Grant support

1995-1996	Grant from the Russian Foundation for Basic Research 95-04-11345, Principal Investigator (highly competitive grant equivalent to NIH funding that funded a technician, two students, myself and research supplies)
2003-2004	Grant from Human Growth Foundation, "Growth hormone-activated adapter protein SH2-Bbeta regulats cell behavior and survival via serine-threonine kinase PAK", N004546, Principal Investigator.
2003-2004	MDRTC Pilot/Feasibility grant ""PAK1 is tyrosyl phosphorylated by growth hormone-activated JAK2 kinase and protect cells from apoptosis", Principal Investigator. $ 45,000 total direct cost.
06.04.2004-06.04.2006	NIH/NIAID 1 R21, AI05778-01A1, "Role of adapter proteins in infection disease". Principal Investigator. $ 610,522 total cost.
Pending:	NIH/NIDDK R21 "Role of serine-threonine kinase PAK1 in prolactin-depending signaling". Principal Investigator. $ 275,000 total direct cost
	American Cancer Society, "JAK2-PAK1 interaction in human breast cancer". Principal Investigator. $ 800,000 total direct cost.

Scientific Activities

1991-1994	ad hoc reviewer for "Tsitologia" (Russia)
2000	ad hoc review (with C. Carter-Su) for "Endocrinology"
2003	ad hoc review (with C. Carter-Su) for "Experimental Cell Research"

Awards and Fellowships

1988 Selected for participation in practical course for young scientists "EM immunocytochemistry with colloidal gold", Prague, Tchechia

1992 Boehringer Ingelheim Fellowship, Department of Molecular Cell Biology, University of Utrecht, the Netherlands
1992 Travel grant from the International Society of Differentiation to participate at Conference "Cellular Programmes for Growth, Differentiation and Neoplasia", Helsinki, Finland
1993 Travel grant from International Science Foundation to participate in the International Workshop "Signal Transduction Pathways and Second Messengers", Florence, Italy
1993 Research Award from International Science Foundation
1994 Travel grant from the Russian Foundation for Basic Research to participate at the Conference "Cellular Programmes for Growth", Tokyo, Japan
1995 UNESCO Fellowship, EMBL, Heidelberg, Germany
2001 Chair Grant to participate at Gordon Research Conference, Oxford, England
2004 Abstract Award from Women in Endocrinology Society

Memberships and offices in professional societies

1998- present - Member of the American Society for Cell Biology
2004 – present – Member of American Endocrinology Society
2004 – present – Member of Women in Endocrinology Society

Teaching Experience

1993	Course "Regulation of endocytosis and signal transduction" for students of the St.-Petersburg State University, Department of Cell Biology, Lecturer, (12 h per semester).
1993-1994	Practical course in General Cytology for students of the St.-Petersburg State University, (48h per semester)
1996	Supervisor of D. Chilov Work (M.S. student, Institute of Cytology, St.-Petersburg, Russia)
1995	Supervisor of M. Lebedeva (undergraduate student, St.-Petersburg State University, Russia)
2000-2001	Supervisor of Kathryn Selva (Undergraduate Research Opportunity Program, University of Michigan).
2000-2001	Supervisor of Ingrid Spangler (Undergraduate Research Opportunity Program, University of Michigan).
2000-2001	Supervisor of Chethra Muthiah (Junior, Undergraduate Program, University of Michigan)
2004-2004	Supervisor of Gina Casian (Volunteer)
2004-2004	Supervisor of Dr. Shatrova (Postdoctoral Fellow)
2004-2005	Supervisor of Drs. Komarova and Islam (Postdoctoral Fellows)
2004-now	Supervisor of Stephanie Cook (Research Assistant) and Leah Daniel (Research Assistant)

Extramural Invited Presentation

"Internalization and intracellular sorting of growth factor receptors", INSERM, Rennes, France. May, 1991.

"Internalization of epidermal growth factor receptor and its mutants", University of Utrecht, Dep. Molecular and Cell Biology, the Netherlands. September, 1992

"Role of annexins in phagocytosis" Institute of Cytology, St.-Petersburg, Russia. March, 1997

"Dynamics of cytockeletal proteins during Fcγ-receptor-mediated phagocytosis " St.-Petersburg State University, Dep. Cell Biology, St.-Petersburg, Russia. June, 1999.

"Role of signaling proteins in regulation of the actin cytoskeleton", Evacyte Inc., Austin, TX. July, 2001

"SH2-Bβ is a novel Rac-binding protein" Northwestern University, Department of Cell and Molecular Biology, Chicago. September,2001

"SH2-Bβ is a Rac binding protein that regulates cell motility" The University of Chicago, Department of Molecular Genetics and Cell Biology. January, 2002.

"SH2-Bβ is a novel Rac binding protein" Institute of Cytology Russian Academy of Science. June, 2002.

"SH2-Bβ is a novel Rac/PAK-binding adapter protein". Gordon Research Conference "Mechanism of Cell Signaling", Ventura, CA. June, 2003.

"SH2-Bβ is a novel Rac/PAK-binding adapter protein". Endocrinology Meeting, New Orleans, 2004

Other presentations

"SH2-Bβ protein regulates cell motility " Post-Doctoral Seminar Series, University of Michigan. November, 2000.

Community Service

March 2001 - Science Fair Judge
March 2002 - Science Fair Judge
March 2003 - Science Fair Judge

PUBLICATIONS - Maria Diakonova (peer reviewed)

1. Freedlanskaya I.I., Galactionov K.I., **Diakonova M.Y.,** Pinaev G.F. Microfilamin- a new cytoskeleton 53 kD protein. DAN USSR, 289(6), 1511-1513, 1986

2. Poljanskaya G.G., **Diakonova M.Y**. The influence of cultivation conditions on the karyotypic structure of a subline of rat kangaroo kidney cells. Tsitologia, 30(11), 1355-1363, 1988

3. **Diakonova M.Y.,** Sorkin A.D., Nikolsky N.N., Effect of primaquine on endocytosis of receptors of epidermal growth factor in A431 cells. Tsitologia, 34(7), p.63-69, 1992

4. **Diakonova M.Y.,** Sorkin A.D., Nikolsky N.N. Internalization of normal and mutant receptors of the platelet-derived growth factor. Tsitologia, 34(8), p.74-81, 1992

5. Clement B., Loreal O., Rescan P.-Y., Levavasseur F., **Diakonova M.**, Rissel M.,Helgoualc'h A.,Guillouzo A. Cellular origin of the hepatic extracellular matrix. In: Molecular and Cell Biology of Liver Fibrogenesis. Grenner Eds.,Kluver,UK, 1992.

6. **Diakonova M.Y.**, Nikolsky N.N., Immunocytochemical study of the spontaneous and ligand-induced endocytosis of EGF-R in A431 cells, Tsitologia, 36(6), 74-81, 1994

7. **Diakonova** M., B.Payrastre, A.van Velzen, W.J. Hage,P.van Bergen en Henegouwen, J.Boonstra, F.Cremers,B.Humbel. EGF induces rapid and transient association of PLCγ1 with EGF-receptor and filamentous actin at membrane ruffles of A431 cells. Journal of Cell Science, 108, 2499-2509, 1995

8. Medvedeva N., Chupreta S., **Diakonova M.**, Tvorogov D., Blagovestschenskaia A., Nikolsky N. Action of nocodazol on redistribution of PLCγ1 under mitogenic signal. Tsitologia, 39, 872-878, 1997

9. **Diakonova M.,** Chilov D., Arnautov A., Alexseyev V., Nikolsky N., Medvedeva N, Intracellular distribution of PLCγ1 in cell lines with different level of transformation. Europ. J. Cell. Biol., 73, 360-367, 1997

10. **Diakonova M.,** Gerke V., Ernst J., Liautard J.-P., van der Vusse,G., Griffiths G. Localization of five annexins in J774macrophages and on isolated phagosomes. Journal of Cell Science, 110, 1199-1213, 1997

11. Defacque H., M. Egeberg, A. Huberman, **M. Diakonova**, C. Roy, P. Mangeat, W. Voelter, G. Marriott, J. Pfannsteil, H. Faulstich, G. Griffiths. Involvement of ezrin/moesin in de novo actin assembly on phagosomal membranes. The EMBO J., 19, 199-212, 2000.

12. **Diakonova M.***, J. Herrington*, L. Rui, D. Gunter, C. Carter-Su. SH2-Bβ is required for growth hormone-induced actin reorganization. J. Biological Chemistry, 275, 13126-13133, 2000 (equal contribution).

13. Carter-Su C., L. Rui, J. Herrington, M. Stofega, **M. Diakonova**. Growth hormone signaling pathways. In "Targets for Growth Hormone and IGF-1 action", Ed R. Bouillon, 1-13, BioScientifica Ltd, Bristol, 2001.

14. **Diakonova M.**, G. Bokoch, J.A. Swanson. Dynamics of cytockeletal proteins during Fcgamma-receptor-mediated phagocytosis in macrophages - Mol. Biol. of Cell, 13, 402-411, 2002.

15. **Diakonova M.**, D. R. Gunter, J. Herrington, C.Carter-Su. SH2-Bβ is a Rac binding protein that regulates cell motility - J. Biol. Chem., 277, 10669-10677, 2002.

16. O'Brien KB., L.S. Argetsinger, **M. Diakonova**, C. Carter-Su. YXXL motifs in SH2-Bbeta are phosphorylated by JAK2, JAK1, and platelet-derived growth factor receptor and are required for membrane ruffling. J. Biol. Chem, 278, 11970 - 11978, 2003.

17. **Diakonova M.**, E. Helfer, T. Svitkina, J. Swanson, C. Kocks, G. Borisy, M.-F. Carlier, C. Carter-Su. Adapter protein SH2-Bβ bundles actin and stimulates VASP-dependent motility. August 2005, resubmitted to Mol. Cell. Biol. after first review.

LIST OF FERERENCES

1. **Dr. Christin Carter-Su, Ph.D.**
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