

## **CURRICULUM VITAE**

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### **EDUCATION**

#### **Ph.D. in Biological Sciences (Biophysics and Cell Physiology)**

**1999** Institute of Cell Biophysics, Russian Academy of Sciences  
Institutskaya St., Pushchino, Moscow Region 142292, Russia

#### **B.S. and M.S. in Biochemistry**

**1991** Moscow State Academy of Veterinary Medicine and Biotechnology  
23 Skryabin St., Moscow 109472, Russia

### **POSITIONS HELD**

02/2008 –present Assistant Professor, Dept. Molecular Biophysics and Physiology,  
Rush University Medical Center, Chicago, IL, USA  
07/2006-01/2008 Research Assistant Professor, Department of Physiology  
Loyola University Chicago  
Maywood, IL 60153  
11/1999-07/2006 Research Associate, Department of Physiology  
Loyola University Chicago  
Maywood, IL 60153  
11/1994-11/1999 Junior Research Scientist (pre-doctoral position)  
Laboratory of Intracellular Signaling  
Institute of Cell Biophysics, Russian Academy of Sciences,  
Pushchino, Moscow Region 142292, Russia  
09/1991-11/1994 Candidate for researcher's career,  
Laboratory of Molecular Radiobiology  
Institute of Cell Biophysics, Russian Academy of Sciences,  
Pushchino, Moscow Region 142292, Russia

## **RESEARCH ACTIVITIES AND INTERESTS:**

(1) Vascular Physiology. Mechanisms of intracellular  $\text{Ca}^{2+}$  release and capacitative  $\text{Ca}^{2+}$  entry regulation in non-excitabile cells. Investigation of cellular mechanisms of the regulation of nitric oxide (NO) production and release from vascular endothelial cells. Study of the role of NO for  $[\text{Ca}^{2+}]_i$  regulation in vascular endothelial cells.

(2) Cardiac Physiology. Study of mechanisms of excitation-contraction coupling and calcium regulation in cardiac (ventricular and atrial) muscle. Study of NO-dependent signaling pathways in cardiac cells. Role of cytoskeleton in regulation of NO production in cardiomyocytes.

(3) Mitochondria. Study of the mechanisms of NO and ROS production from mitochondria of vascular endothelial cells and cardiomyocytes by mitochondrially-located nitric oxide synthase (mtNOS). Role of locally produced NO and ROS in regulation of mitochondrial  $\text{Ca}^{2+}$  fluxes, membrane potential and permeability transition pore in mitochondria of vascular endothelial cells and cardiomyocytes. Mechanisms of mitochondria-mediated cardioprotection.

In experimental research I use the following methods: 1) isolation of different types of cells including T-lymphocytes, peritoneal neutrophils, Ehrlich ascites tumor cells, cardiac myocytes; 2) cell culture of vascular endothelial cells; 3) optical measurements (wide field and confocal microscopy) of cytoplasmic concentrations and mitochondrial transport of  $\text{Ca}^{2+}$ , NO and reactive oxygen species (ROS) production, intracellular pH and membrane potential with intracellular fluorescent dyes; 3) measurement of the NADH and FADH fluorescence; 4) measurement of ROS production by chemiluminescence technique; 5) measurement of cell respiration by Strathkelvin micro volume precision respirometry system (Clark-type electrode); 6) biochemical approaches (Western blot, ELISA).

## **PROFESSIONAL SUPPORT AND HONORS**

07/01/2007-06/30/2011 American Heart Association National Scientist Development Grant # 0735071N "Mechanisms of Mitochondria-Mediated Cardioprotection by Trimetazidine in ventricular myocytes"

2007 American Heart Association Greater Midwest Scientist Development Grant # 0735455Z "Mechanisms of Mitochondria-Mediated Cardioprotection by Trimetazidine in ventricular myocytes" (declined)

07/01/2004-06/30/2006 American Heart Association Greater Midwest Affiliate, Postdoctoral Fellowship # 0425761Z, "Contractile activity stimulates nitric oxide production in cat ventricular myocytes through cytoskeletal-dependent mechanisms"

1999 FEBS Travel Award for Participation in FEBS Advanced Course: "Free Radicals, Nitric Oxide and Antioxidants in Health and Disease"

11/01/1996-10/31/1998 Jorge Soros's Award for Advanced Postgraduate Students, Moscow

## TEACHING EXPERIENCE

- 11/2007 Nitric Oxide Signaling lecture as a part of Signal Transduction Course (Fall Semester 2007) for Physiology 471 Graduate Program at Loyola University Medical Center, Maywood, IL. Course director: Mitchel F. Denning, PhD, Associate Professor of Pathology, Loyola University Medical Center, Maywood, IL
- 09/1999-10/1999 Practical course for postgraduate students of Pushchino State University, Russia: "Fluorescence techniques for the measurement of intracellular  $\text{Ca}^{2+}$  and pH in living cells".

## PROFESSIONAL MEMBERSHIPS

Biophysical Society (1999-present)

## PUBLICATIONS

1. **Dedkova E.N.**, Blatter L.A. Mitochondrial  $\text{Ca}^{2+}$  and the heart. *Cell Calcium* 2008 (Invited Review, in press).
2. **Dedkova E.N.**, Wang Y.G., Ji X., Blatter L.A., Samarel A.M., Lipsius S.L. Signaling mechanisms in contraction-mediated stimulation of intracellular NO production in cat ventricular myocytes. *J. Physiol.* 2007, 580 (1): 327-345. Epub 2007 Jan 18.
3. Sedova M., **Dedkova E.N.**, Blatter L.A. Integration of rapid cytosolic  $\text{Ca}^{2+}$  signals by mitochondria in cat ventricular myocytes. *Am. J. Physiol. Cell Physiol.*, Nov; 291(5):C840-50. Epub 2006 May 24.
4. **Dedkova E.N.**, Blatter L.A. Modulation of Mitochondrial Calcium by Nitric Oxide in Cultured Bovine Vascular Endothelial Cells. *Am. J. Physiol. Cell Physiol.*, **2005** Oct; 289(4): C836-845. Epub 2005 May 18.
5. Wang Y.G., **Dedkova E.N.**, Ji X., Blatter L.A., Lipsius S.L. Phenylephrine acts via  $\text{IP}_3$ -dependent intracellular NO release to stimulate L-type  $\text{Ca}^{2+}$  current in cat atrial myocytes. *J. Physiol.*, **2005** Aug 15; 567(Pt 1): 143-157. Epub 2005 Jun 9.
6. **Dedkova E.N.**, Ji X., Lipsius S.L., Blatter L.A. Mitochondrial calcium uptake stimulates nitric oxide production in mitochondria of bovine vascular endothelial cells. *Am. J. Physiol. Cell Physiol.*, **2004**, 286, C406-415.
7. **Dedkova E.N.**, Ji X., Wang Y.G., Blatter L.A., Lipsius S.L. Signaling mechanisms that mediate NO production induced by ACh exposure and withdrawal in cat atrial myocytes. *Circ. Res.*, **2003**, 93, 1233-1240.
8. Wang Y.G., **Dedkova E.N.**, Fiening J. P., Ojamaa K., Blatter L. A., Lipsius S.L. Acute exposure to thyroid hormone increases  $\text{Na}^+$  current and intracellular  $\text{Ca}^{2+}$  in cat atrial myocytes. *J. Physiol.*, **2003**, 546, 491-499.
9. **Dedkova E.N.**, Wang Y.G., Blatter L.A., Lipsius S.L. Nitric oxide signalling by selective  $\beta_2$ -adrenoceptor stimulation prevents ACh-induced inhibition of  $\beta_2$ -stimulated  $\text{Ca}^{2+}$ -current in cat atrial myocytes. *J. Physiol.*, **2002**, 542, 711-723.

10. **Dedkova E.N.**, Blatter L.A. Nitric oxide inhibits capacitative Ca<sup>2+</sup> entry and enhances endoplasmic reticulum Ca<sup>2+</sup> uptake in bovine vascular endothelial cells. *J. Physiol.*, **2002**, 539, 77-91.
11. Wang Y.G., **Dedkova E.N.**, Steinberg S.F., Blatter L.A., Lipsius S.L. Beta 2-adrenergic receptor signaling acts via NO release to mediate ACh-induced activation of ATP-sensitive K<sup>+</sup> current in cat atrial myocytes. *J. Gen. Physiol.*, **2002**, 119, 69-82.
12. **Dedkova E.N.**, Sigova A.A., Zinchenko V.P. Mechanism of action of calcium ionophores on intact cells: ionophore-resistant cells. *Membr Cell Biol.*, **2000**, 13, 357-368.
13. Sigova A.A., **Dedkova E.N.**, Zinchenko V.P., Litvinov I.S. Reduction of Ca<sup>2+</sup>-transporting systems in memory T cells. *Membr Cell Biol.*, **2000**, 14, 97-107.
14. **Dedkova E.N.**, Alovskaya A.A., Gabdulhakova A.G., Safronova V.S., Zinchenko V.P. Priming effect of calcium ionophores on phorbol ester-induced respiratory burst in mouse peritoneal neutrophils. *Biochemistry (Mosc.)*, **1999**, 64(7):788-794.
15. Sigova A.A., **Dedkova E.N.**, Zinchenko V.P., Litvinov I.S. A comparative study of calcium system in memory T cells and naive T cells. *FEBS Lett.*, **1999**, 447, 34-38.
16. Alovskaya A.A., Gabdulhakova A.G., Gapeev A.B., **Dedkova E.N.**, Safronova V.G., Fesenko E.E., Chemeris N.K. Biological effects by EHF EMF depends on functional status of neutrophils. *News of medical technology*, **1998**, 1, 36-40 (Russian).
17. Zinchenko V.P., Mysiakin E.B., Dolgachev V.A., **Dedkova E.N.**, Safronova V.G., Gapeev A.B., Shebzukhov Iu.V., Vaisbud M.Iu. Effect of structural analogs of platelet activating factor on the intracellular signal transduction in murine peritoneal neutrophils and macrophages of P388D1 line. *Biofizika*, **1997**, 42, 1097-1105. (Russian)
18. Abdrasilov B.S., Kim Yu.A., Nurieva R.I., **Dedkova E.N.**, Leonteva G.A., Hwa-Jin Park, Zinchenko V.P. The effect of total saponins from Panax Ginseng C.A. Meyer on the intracellular signalling system in Ehrlich ascites tumor cells. *Biochemistry and Molecular Biology International*, **1996**, 38, 3, 519-526.
19. Nurieva R.I., **Dedkova E.N.**, Leont'eva G.A., Abdrasilov B.S., Pak Kh.D., Kim Yu.A., Zinchenko V.P. Mechanism of activation of Ehrlich ascites carcinoma cells using the total fraction of saponins from Korean ginseng. *Antibiot Khimioter.*, **1995**, 40, 25-28.
20. Kuzin A.M., Yurov S.S., Shchelkaeva N.V., **Dedkova E.N.** Mutability of *Sporobolomyces Alborubescence Derx* exposed to long-term chronic  $\gamma$ -irradiation at low dose-rates. *Radiobiology*, **1994**, 3, 419-423 (Russian).

#### **ABSTRACTS:**

1. **Dedkova E.N.**, Blatter L.A. Trimetazidine rescues calcium transient and mechanical alternans in cardiac myocytes from the failing heart. 52st Annual Meeting of Biophysical Society, February 2-6, **2008**, Long Beach, California // *Biophysical Journal*, 2008, Vol. 94, 1537-Pos.
2. **Dedkova E.N.**, Blatter L.A. Cardioprotection by trimetazidine is mediated by inhibition of mitochondrial permeability transition pore (PTP) through decreasing fatty acid-induced oxidative stress. 51st Annual Meeting of Biophysical Society, March 3-7, **2007**, Baltimore, Maryland // *Biophysical Journal*, 2007, Vol. 93, 2812-Pos, B177.
3. **Dedkova E.N.**, Blatter L.A. Mitochondrial calcium uptake stimulates nitric oxide and ROS production by mitochondria-specific nitric oxide synthase in cat ventricular myocytes. 50th

- Annual Meeting of Biophysical Society, February 18-22, **2006**, Salt Lake City, Utah // *Biophysical Journal*, 2006, Vol. 91, 2538-Pos, B205.
4. **Dedkova E.N.**, Blatter L.A., Lipsius S.L. Acetylcholine (ACh) withdrawal induces rebound stimulation of intracellular calcium release mediated by NO and IP<sub>3</sub>-dependent signaling. 49th Annual Meeting of Biophysical Society, February 12-16, **2005**, Long Beach, California // *Biophysical Journal*, 2005, Vol. 88, N. 1, 2142-Pos, P. 438a.
  5. **Dedkova E.N.**, Ji X., Lipsius S.L., Blatter L.A. Mitochondrial Calcium Uptake Stimulates Nitric Oxide Production in Mitochondria-specific nitric oxide synthase in Bovine Vascular Endothelial Cells. 48th Annual Meeting of Biophysical Society, February 14-18, **2004**, Baltimore, Maryland // *Biophysical Journal*, 2004, Vol. 86, N. 1, 560-Pos, P. 105a.
  6. **Dedkova E.N.**, Wang Y.G., Blatter L.A., Lipsius S.L. Contractile activity stimulates nitric oxide production in cat ventricular myocytes via PI-(3)K-cytoskeletal signaling. 48th Annual Meeting of Biophysical Society, February 14-18, **2004**, Baltimore, Maryland // *Biophysical Journal*, 2004, Vol. 86, N. 1, 2071-Pos, P. 399a.
  7. **Dedkova E.N.**, Wang Y.G., Blatter L.A., Lipsius S.L. Contractile activity acts via cytoskeletal signaling to stimulate NO production in cat ventricular myocytes. Annual Scientific Session of American Heart Association, November 9-12, **2003**, Orlando, Florida // *Circulation*, 108, N. 17, 404-Abs, p. IV-86
  8. Lipsius S.L., Wang Y.G., Ji X., Blatter L.A., **Dedkova E.N.** Alpha-1 adrenoreceptor stimulation by Phenylephrine stimulates L-type calcium current via nitric oxide production in cat atrial myocytes. Annual Scientific Session of American Heart Association, November 9-12, **2003**, Orlando, Florida // *Circulation*, 108, N. 17, 1385-Abs, p. IV-292
  9. **Dedkova E.N.**, Blatter L.A., Lipsius S.L. ACh acts via G<sub>i</sub>-Protein-PI(3)K signaling to stimulate nitric oxide (NO) production in cat atrial myocytes. 47th Annual Meeting of Biophysical Society, March 1-5, **2003**, San Antonio, Texas // *Biophysical Journal*, 82, N.2, 1920-Pos, P. 394a
  10. **Dedkova E.N.**, Blatter L.A. Modulation of mitochondrial calcium by nitric oxide in vascular endothelial cells. 46th Annual Meeting of Biophysical Society, February 23-27, **2002**, San Francisco, California // *Biophysical Journal*, 82, N.1, 556-Pos
  11. **Dedkova E.N.**, Y. G. Wang, S. F. Steinberg, L.A. Blatter, S.L. Lipsius β<sub>2</sub>-adrenergic receptors act via PI(3)K signaling to mediate nitric oxide (NO) release in atrial myocytes. 46th Annual Meeting of Biophysical Society, February 23-27, **2002**, San Francisco, California // *Biophysical Journal*, 82, N.1, 1316-Pos
  12. **Dedkova E.N.**, Blatter L.A. Nitric oxide inhibits capacitative Ca<sup>2+</sup> entry in vascular endothelial cells. 45th Annual Meeting of Biophysical Society, February 17-21, **2001**, Boston, Massachusetts // *Biophysical Journal*, 80, N.1, 2786-Pos.
  13. **Dedkova E.N.**, Zinchenko V.P. Arachidonic acid inhibits the receptor-dependent and store-dependent capacitative Ca<sup>2+</sup> influx in Erlich ascites tumor cells. 44th Annual Meeting of Biophysical Society, February 12-16, **2000**, New Orleans, Louisiana // *Biophysical Journal*, 78, N.1, 1132-Pos.
  14. Safronova V.G., Alovskaya A.A., Gabdulhakova A.G., **Dedkova E.N.**, Zinchenko V.P., Chemeris N.K. Role extracellular calcium in priming of neutrophil respiratory burst by calcium ionophore. 42nd Annual Meeting of Biophysical Society, 22-26 February **1998**, Kansas City, Missouri // *Biophysical Journal*, 74, 2, part 2 of 2, 286-Pos.

15. **Dedkova E.N.**, Gabdulhakova A.G., Alovskaya A.A., Safronova V.G., Zinchenko V.P. Calcium ionophores in cell activation and priming. // 25th Silver Jubilee FEBS Meeting, July 5-10, **1998**, The Bella Center, Copenhagen, Denmark, 6-51-Pos.
16. Alovskaya A.A., **Dedkova E.N.**, Safronova V.G. Neutrophil respiratory burst: mechanism inactivation // 25th Silver Jubilee FEBS Meeting, July 5-10, **1998**, The Bella Center, Copenhagen, Denmark, 6-52-Pos.
17. Safronova V.G., Gabdulhakova A.G., Alovskaya A.A., **Dedkova E.N.**, Gapeyev A.B., Chemeris N.K, Fesenko E.E. Biological effects of extremely high frequency electromagnetic field depends on functional status of neutrophils. // An Annual Meeting of Professional Research Scientists, April 18-22, **1998**, Moscone Convention Center, San Francisco, California, A-Pos95.
18. Safronova V.G., Alovskaya A.A., Gabdulhakova A.G., **Dedkova E.N.**, Zinchenko V.P., Chemeris N.K. Priming mechanism of calcium ionophores in activation of neutrophil respiratory burst. 41st Annual Meeting of Biophysical Society, March 2-6, **1997**, New Orleans, Louisiana // *Biophysical Journal*, 72, 274-Pos.
19. Zinchenko V.P., Mysyakin E.V., Dolgachev V.A., Barrat G., **Dedkova E.N.**, Safronova V.G., Gapeev A.B., Shebzuhov Yu.V., Vaisbud M.Yu. The effect of platelet activating factor structural analogues on signal transduction in mouse peritoneal neutrophils and macrophages line P388D1. // 12 Conference of the European Macrophage Study Group, September 17-19, **1998**, Institut Pasteur, Paris, France.
20. **Dedkova E.N.**, Sigova A.A., Zinchenko V.P., Litvinov I.S. A comparative study of intracellular signalling system in memory T cells and naive T cells. // The first International Conference on Signal transduction, Dubrovnic-Cavrat, 8-11 October, **1998**.
21. **Dedkova E.N.**, Alovskaya A.A., Gabdulhakova A.G., Safronova V.G., Zinchenko V.P. Calcium ionophores in cell activation and priming. // The Third Scientific Conference of Young Scientists, Pushchino, April 23-25, **1998**, 111-112.
22. Sigova A.A., **Dedkova E.N.**, Zinchenko V.P., Litvinov I.S. A comparative study of intracellular signalling system in memory T cells and naive T cells. // The Third Scientific Conference of Young Scientists, April 23-25, Pushchino, **1998**, 130-131.
23. Gabdulhakova A.G., Alovskaya A.A., **Dedkova E.N.** Elements of synergy activation mechanism of neutrophil respiratory burst. The Second Scientific Conference of Young Scientists, Pushchino, 23-25 April, **1997**, 96.
24. Sigova A.A., **Dedkova E.N.**, Zinchenko V.P., Litvinov I.S. The reason of memory T-cells resistance to Ca<sup>2+</sup>-ionophores. The Second Scientific Conference of Young Scientists, Pushchino, April 21-24, **1997**, 116-117.
25. **Dedkova E.N.**, Alovskaya A.A., Gabdulhakova A.G. Activating mechanism of calcium ionophores on the intact cells. Different cell sensibility to ionophores. The First Scientific Conference of Young Scientists, Pushchino, **1996**, 36.

## **PRESENTED SEMINARS**

1. 10/22/07, Invited seminar presented at the Department of Molecular Biophysics and Physiology, Rush University Medical Center "Mitochondrial calcium and nitric oxide in the heart".

2. 08/31/05, Seminar presented at Physiology Department, Loyola University Chicago  
“Mitochondrial calcium –nitric oxide signaling in vascular endothelial cells”.
3. 05/24/02, Seminar presented at Physiology Department, Loyola University Chicago  
“Calcium signaling in vascular endothelial cells: capacitative Ca<sup>2+</sup> entry and nitric oxide”.