

SHORT CV

Dr. Natalia V. Bykova

Assistant Professor
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Research Interests:

Research is centered on functional modification-specific proteomics; posttranslational coordination of signal transduction pathways induced in plants during biotic, abiotic stress response and seed development; the role of posttranslational signalling for bioenergetic functions of plant mitochondria; mass spectrometry-driven de-novo protein sequencing, analysis of phosphorylation, glycosylation and cysteine oxidoreduction; proteomics-specific experimental bioinformatics.

Professional Positions and Training:

2008 – Present time - **Assistant Professor** at the Department of Biology, Memorial University of Newfoundland

2004 – 2008 - **Research Scientist** (RES02) at the Cereal Research Centre, Agriculture and Agri-Food Canada, Winnipeg, Manitoba, Canada

2003 – 2004 – **Biologist** at the Cereal Research Centre, Agriculture and Agri-Food Canada, Winnipeg, Manitoba, Canada. Collaborative research project “The proteomic and phosphoproteomic approaches in studying resistance to leaf rust in wheat” with Dr. Christof Rampitsch

2002 – 2004 – **Research Associate** at the Manitoba Centre for Proteomics, Department of Physics and Astronomy, University of Manitoba, Winnipeg, Manitoba, Canada. Research project “Time-of-flight mass spectrometry applications in protein chemistry and cell biology” with Prof. Werner Ens and Prof. Kenneth Standing

2001 – 2002 – **Postdoctoral Position** at the Plant Research Department, Risø National Laboratory, Roskilde, Denmark. Research project “The functional proteomics of mitochondria from rice (*Oryza sativa*)” with Prof. Ian Max Møller

1998 – 2001 - **Postdoctoral Fellow** at the Department of Plant Physiology (Umeå Plant Science Centre), Umeå University, Sweden. Research project on EU Biotechnology Framework IV “Transgenic potato plants deficient in glycine decarboxylase complex” with of Prof. Per Gardeström

1998 – 2000 – **Research Scholarship** from the Swedish Institute at the Department of Plant Physiology, Lund University, Sweden. Research project on bioenergetics of plant mitochondria with Prof. Ian Max Møller

1996 - 1998 - **Lecturer**, Voronezh State University, Department of Plant Physiology and Biochemistry, Voronezh, Russia

1996 - International Science Foundation, awarded Degree of **G. Soros Postgraduate Student** (Open Society Institute G. Soros Postgraduate Studentship)

1996 - **Ph.D.** (Biochemistry), Voronezh State University, Russia.

1994 - **Visiting Postgraduate Research Student** at Free University of Berlin, Germany. Research on carbohydrate metabolism in higher plants in the laboratory of Prof. Claus Schnarrenberger

1992 - **M.Sc.** (Biology, Plant Physiology and Biochemistry), Voronezh State University, Russia

Current teaching:

BIOL 4245 Biophysics (year 4 undergraduate); BIOL 4255 Proteomics (year 4 undergraduate)
BIOL 7937 Proteomics (graduate course)

Professional Memberships:

American Society for Mass Spectrometry; Canadian Society of Plant Physiologists; American Society of Plant Biologists

Relevant Publications:

- [1] Bykova NV, Hoehn B, Rampitsch C, Hu J, Stebbing J-A, Knox R (2011) Thiol redox-sensitive seed proteome in dormant and non-dormant hybrid genotypes of wheat. *Phytochemistry*, in press, doi:10.1016/j.phytochem.2010.12.021.
- [2] Bykova NV, Hoehn B, Rampitsch C, Banks T, Stebbing J-A, Fan T, Knox R (2011) Redox-sensitive proteome and antioxidant strategies in wheat seed dormancy control. *Proteomics* 11: 865–882.
- [3] Igamberdiev AU, Bykova NV, Hill RD (2011) Structural and functional properties of class 1 plant hemoglobins. *IUBMB Life* 63: 146–152.
- [4] Rampitsch C, Subramaniam R, Djuric-Ciganovic S, Bykova NV (2010) The phosphoproteome of *Fusarium graminearum* at the onset of nitrogen starvation reveals phosphopeptides from proteins with a potential role in mycotoxin regulation. *Proteomics* 10: 124–140.
- [5] Igamberdiev A, Bykova NV, Shah JK, Hill RD (2010) Anoxic nitric oxide cycling in plants: participating reactions and possible mechanisms. *Physiologia Plantarum* 138: 393–404.
- [6] Rampitsch C, Bykova NV (2009) Methods for Functional Proteomic Analyses, In: *Plant Genomics: Methods and Protocols. Methods in Molecular Biology*. Vol. 513. DJ Somers, Langridge P, Gustafson JP, eds, Humana Press. 352 pp.
- [7] Juszczuk IM, Bykova NV, Møller IM (2007) Protein phosphorylation in plant mitochondria (a review). *Physiologia Plantarum* 129: 90-103.
- [8] Bykova NV, Møller IM (2006) Proteomics of plant mitochondria, In: *Plant Proteomics. Annual Plant Reviews*. Vol. 28, C Finnie, ed., Blackwell Publishing; pp 211-243.
- [9] Bykova NV, Rampitsch C, Krokhn O, Standing KG, Ens W (2006) Determination and characterization of site-specific N-glycosylation using MALDI-Qq-TOF tandem mass spectrometry: case study with a plant protease. *Analytical Chemistry* 78: 1093-1103.
- [10] Bykova NV, Igamberdiev AU, Ens W, Hill RD (2006) Identification of an intermolecular disulfide bond in barley hemoglobin. *Biochemical and Biophysical Research Communications* 347: 301-309.
- [11] Rampitsch C, Bykova NV, McCallum B, Beimcik E, Ens W (2006) Analysis of the wheat and *Puccinia triticina* (leaf rust) proteomes during a susceptible host-pathogen interaction. *Proteomics* 6(6): 1897-1907.
- [12] Rampitsch C, Bykova NV, Mauthe W, Yakandawala N, Jordan M (2006) Phosphoproteomic profiling of wheat callus labelled in vivo. *Plant Science* 171: 488-496.
- [13] Igamberdiev A, Bykova NV, Hill R. (2006) Nitric oxide scavenging by barley hemoglobin is facilitated by a monodehydroascorbate reductase-mediated ascorbate reduction of methemoglobin. *Planta* 223: 1033-1040.
- [14] Bykova NV, Keerberg O, Pärnik T, Bauwe H, Gardeström P (2005) Interaction between photorespiration and respiration in transgenic potato plants with antisense reduction in glycine decarboxylase. *Planta* 222: 130-140.
- [15] Igamberdiev AU, Bykova NV, Ens W, Hill RD (2004) Dihydropyridine dehydrogenase from porcine heart catalyzes NADH-dependent scavenging of nitric oxide. *FEBS Letters* 568: 146-150.
- [16] Kristensen BK, Askerlund P, Bykova NV, Egsgaard H, Møller IM (2004) Identification of oxidised proteins in rice leaf mitochondria by immunoprecipitation and two-dimensional liquid chromatography-tandem mass spectrometry. *Phytochemistry* 65: 1839-1851.
- [17] Bykova NV, Stensballe A, Egsgaard H, Jensen ON, Møller IM (2003) Phosphorylation of formate dehydrogenase in potato tuber mitochondria. *Journal of Biological Chemistry* 278: 26021-26030.
- [19] Bykova NV, Egsgaard H, Møller IM (2003) Identification of 14 new phosphoproteins involved in important plant mitochondrial processes. *FEBS Letters* 540: 141-146.