Doctor of Science Vasil Bregadze



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Education

M. Sc. in Biophysics, Moscow Physical-Technological Institute, Dolgoprudny, MoscowRegion, 1964

Post Graduate, Moscow Physical-Technological Institute, Dolgoprudny, MoscowRegion, 1968

Ph.D. in Biophysics, Institute of Biophysics, Academy of Sciences of the USSR (Puschino, Moscow Region, Russia), 1970

Doctor of Sciencein Biophysics, M. Lomonosov Moscow State University (Moscow Russia), 1989

Work Experience

<u>1964-1968</u>–Post Graduate, Moscow Physical-Technological Institute;

Junior Research Scientist, Institute of Biophysics, Academy of Sciences of the USSR

Laboratory of Photobiology.

- <u>1968-1971</u> Junior Research Scientist, Closed Laboratory Institute of Cybernetics of Georgian Academy of Sc.
- <u>1971-1973</u> Senior Research Scientist Department of Biopolimer Physics Institute of Physics of Georgian Academy of Sc.
- <u>1973-1986</u>- Senior Research Scientist Department of Spectral Research of Biopolimers

Institute of Physics of Georgian Academy of Sc.
<u>1986-1991</u> - Head Scientist
Department of Spectral Research of Biopolimers
Institute of Physics of Georgian Academy of Sc.
<u> 1991-2006</u> - Head Scientist
Department of Nuclear Physical and Optical Methods of Analysis
Institute of Physics of Georgian Academy of Sc.
<u>2006-2009</u> - Senior Research Scientist
Department of Physics of Biological Systems
E.Andronikashvili Institute of Physics
<u>2009- present</u> -Principal Research Scientist
Department of Physics of Biological Systems
IvaneJavakhishvili Tbilisi State University Andronikashvili Institute of Physics

<u>Vasil Bregadze</u> is a famous scientist and his areas of interest are: DNA interactions with water, metal ions, metal nanoparticles and proteins; catalytic activity of DNA double helix; DNA and nanotechnologies; molecular basis of cancerogenesis and toxicity; molecular pharmacology; nanomedicine;photochemotherapy of cancer.

He created a new methodological approach which considers DNA as a model for the following physical processes: 1) proton and electron transfer, 2) nonradiative transfer of electron excitation energy, and 3) light re-emission, that simplifies interpretation of the processes of DNA double helix (polyelectrolyte, tightly structured, arranged, intercalation capable dynamic structure) interactions with light, small molecules, and nanoparticles.

V. Bregadze is the author of more than 120 scientific publications, including 8 conceptual work and 7 books in order to participate. Citation index 202. Superviser of 7 doctorants.

Acknowledgments:

- 1. Grant of the American Physical Society for Commitment to Scientific Excellence, 1993;
- 2. Included as one of 2000 Outstanding Scientists 2009/2010 (Cambridge, England, International Biographical Center, St. Thomas' Place ELY, CB7 4GG, Great Britain).
- 3. Included as one of 2000 Outstanding Intellectuals of the 21st Century -2009/2010
- 4. Included in Marquis Who's Who in Science and Engineering, 2010

Memberships:

- 1. Member of the International EPR (ESR) Society (1992);
- 2. Member of the International Society for Optical Engineering (1997);
- 3. Member of American Chemical Society (2012);
- 4. Member of the Georgian Physical Society (1993).

List of Patents:

2006 - Method of growing leguminous cultures

GE Tbilisi (Author Certificate GE AU 2006 1290 Y);

2006 - Organomineral bacterial fertilizer for processing seeds of leguminous cultures

GE Tbilisi (Author Certificate GE AU 2006 1289 Y);

1986 - Copper determination methods in blood serum USSR Invention and discover state committee (N1276989 A1).

Participation in Scientific Grant Projects

2013-2014 - Shota RustaveliNathionalScientce Foundation - Principal InvestigatorGNSF
41/14.
Purchase of a Deuterium-Halogen Light Source (Avalight – DHC) for Application
in Research and Educational Purposes
2012-2013 – ISTC – Basic
Davelopment of Industrial Prototype Speqtropolarimeter for Medical Use Based
on Liquid Crystal Polarization Diffraction Grating
2010-2012 – ShotaRustaveliNathionalScientce Foundation - Principal InvestigatorGNSF/ST
09-508-2-230.
Study of Influence of Silver Nanoparticles on Redox Reactions of DNA-Transition
Metal Ions Complexes.
2004-2005 – Georgian Academy Grants,Manager2.33.04
DNA as a mediator for metal ions Restoration
2002-2003 – Georgian Academy Grants,Manager 2.25.02
Spectroscopic display of wrong GC pairs in DNA.
2000-2001 – Georgian Academy Grants,Manager 2.26.00
Study of photoinduced interactions between DNA, metal ions and intercalators by
spectroscopic, thermodynamic and hydrodynamic methods.
1997-1999 – Georgian Academy Grants, Participant2.22.97
Study of interaction of Cd(II) ions with biomacromolecules <i>in vivo</i> and <i>in vitro</i> .
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Boards of Scientific organizations and editorial boards of scientific journals:

2000-2006 – Member - MoleculaBioology and Biologikal Physics Institute (B. 03. 03. N3)Dissertational council;

1997-2000 – Member -IvaneJavakhishvilis Tbilisi State University and Nathional Academy of sciences joint (B. 03. 02. cN5) dissertational counce;

1992-2006 – Member - Andronikashvili Institute of Physics (Ph.M 01. 07. N3) Dissertational council.

Selected Publications:

- 1. Bregadze V.G. Interpretation of ultraviolet difference spectra of DNA in complexes with ions of the 1st transitional series, *Biophysics*, 19(1):179-181,(Language:ru)1974
- 2. VG Bregadze, MG Kharatishvili., Spectroscopic study of gamma-irradiated complexes of copper (II) with DNA, *Biophysics*, Volume 25, Issue 4, pp615-616. 1980.
- 3. B.G. Bregadze. Nature of DNA interaction with cations: UV spectroscopic investigations and Marcus theory. *Inter.J.Quantum Chemistry*,XVII,1213-1219 ,1980.
- 4. B.G. Bregadze, G.N. Bezhiashvili, E.S. Gelagutashvili., RF inductively coupled plasma spectrometry of DNA metal complexes:binding constants and water desorption kinetics". *StudiaBiophysica*,101, 151-152, 1984.

- 5. V.G. Bregadze. "UHF-induced plasma emission spectrometry". In the book. "New physical methods in biological research." Moscow, Nauka, pp. 33-45, 1987.
- 6. E.L Andronokashvili., B.G Bregadze., J.R. Monaselidze. Interactions between nickel and DNA: Consideration about the role of nickel in carcinogenesis. In: *"Metal Ions in Biological Systems"*,H.Sigeled.Marcel Decker Inc.N.Y.,Basel, 23, 331-357, 1988.
- 7. V.G. Bregadze, "Metal ion interaction with DNA: considerations on structure, stability and effects from metal ion binding." In: "*Metal Ions in Biological Systems*", (H.Sigel, eds.), Marrcel Dekker Inc., NewYork, Basel, 32, Chap. 12, 419-451, 1996
- 8. V.G. Bregadze, J.G. Chkhaberidze, I.G. Khutsishvili "Effects of Metal Ions on the Fluorescence of Dyes bound to DNA" In: "*Metal Ions in Biological Systems*", (H.Sigel, eds.), Marrcel Dekker Inc., NewYork, Basel, 33, Chap.8, 253-267, 1996
- 9. V. Bregadze, I. Khutsishvili, J. Chkhaberidze, K. Sologashvili. "DNA as a mediator for proton, electron and energy transfer induced by metal ions". *Inorganic Chemical Acta*, 339, 145-159, 2002.
- 10. Vasil G. Bregadze, Eteri S. Gelagutashvili, Ketevan J. Tsakadze, Sophia Z. Melikishvili "Metal-Induced Point Defects in DNA: Model and Mechanisms", *Chemistry&Biodiversity*, v.5, 1980-1989 2008.
- V. Bregadze, E. Gelagutashvili, K. Tsakadze. "Thermodynamic Models of Metal Ion -DNA Interactions.In: *Metal Complex-DNA Interactions*" (Eds. N. Hadjiliadis and E. Sletten, Blackwell Publishing Ltd, UK), Chap. 2, 31-53,2009
- Monaselidze, Jamlet R.; Kiladze, Maya T.; Gorgoshidze, Maya Z.; Khachidze, David G.; Bregadze, Vasil G.; Lomidze, Eteri M.; Lezhava, Theimuraz A., Microcalorimetricstudy of DNA–Cu(II)TOEPyP(4) porphyrincomplex. *Journal of Thermal Analysis and Calorimetry.*, ISSN: 1388-6150, Volume: 108, Issue: 1, Pages: 127-131, 2012
- 13. Vasil G. Bregadze, Zaza G. Melikishvili, Tamar G. Giorgadze., Photo-Induced DNA-Dependent Conformational Changes in Silver Nanoparticles., Advances in Nanoparticles, Vol.2 No.2, 176-181, 2013
- Vasil G. Bregadze, Tamar G. Giorgadze, Zaza G. Melikishvili., "DNA and nanophotonics: original methodological approach", *Nanotechnology Reviews*. Volume 3, Issue 5, Pages 445–465, 2014.
- V.G. Bregadze, Z.G. Melikishvili, T.G. Giorgadze, I.G. Khutsishvili, T.B. Khuskivadze, Z.V. Jaliashvili and K.I. Sigua., Laser - Induced Fluorescence Resonance Energy Transfer for Analysis of Quality of DNA Double Helix, *Laser Phys. Lett.* 13 115601 (pp1-7), 2016.
- 16. Giorgadze T.G., Khutsishvili I.G., Khuskivadze T.B., Melikishvili Z.G. and Bregadze V.G., ThePhenomena of Light Re-radiation and Electron Excitation Energy Transfer in HydrolysisReactions and for Analysis of the Quality of DNA Double Helix, Advanced Techniques inBiology & Medicine, Volume 5, Issue 2, pp1-7, 2017.
- 17. Tamar G. Giorgadze, Irine G. Khutsishvili, Zaza G. Melikishvili and Vasil G. Bregadze, Silver atoms encapsulated in G4 pamam (polyamidoamine) dendrimers as a model for their use in nanomedicine for phototherapy, *Eur. Chem. Bull.*, 9(1), 22-27.2020