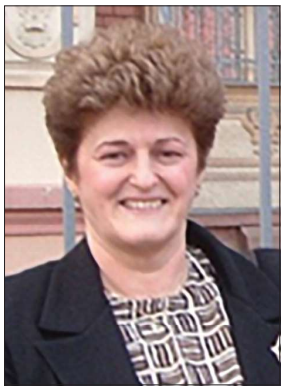
PROTEOMICS DEPARTMENT



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Major position/appointments and professional training

- Member of the Scientific Council
- Ph.D. Coordinator; Advisor for Graduate and Master Programs
- Research fellow: *McGill University, Montreal, Canada.*
- Visiting scientist: *University of Alberta, Edmonton Canada; Max Planck Institute, Bad Nauheim, Germany; University of Texas, Dallas, USA; Molecular Biology and Genetics, Dresden, Germany; Université René Descartes, Paris V, France; L'Université des Sciences et Technologies de Lille I, France.*
- Expert Evaluator/Reporter: *EC Framework; Ministry of Education and Research (MER); National Council of Research and High Education: National Framework for Research, Development and Innovation; Invited peer reviewer for international journals.*
- President of the CNACTCU Commission of MER for high academic degrees (2006-2011).
- Invited Romanian Representative of the Central and Eastern European Proteomic Conference (CEEPC). www.ceepc.eu.
- Member of the Management Comity of the EU FPH 2020 COST Action "CliniMARK" CA 16113 (2016-2020). www.cost.eu/COST Actions/ca/CA16113.

MAJOR RESEARCH INTERESTS

- **Mechanisms of early atherosclerosis and/or plaque instability in Coronary Artery Disease;**
- **Mass spectrometry-based proteomics applied for biomarker research in chronic non-communicable diseases (atherosclerosis, diabetes, cancer, immune disorders);**
- **Membrane microdomains (lipid rafts, plasmalemmal vesicles, caveolae): structural and functional characterization;**
- **Transport of macromolecules in vascular cells: cell receptors, transcytosis, endocytosis.**

PUBLICATIONS

Over 98 original articles (>1950 ISI citations) and data sets were published in collaboration in Web of Sciences journals and 16 monographs in book chapters or reviews during 1979-2019.

- Original data included in Proteomic Database repository: **PRIDE** and **RaftProt**
- One patent in collaboration RO132002-AO
- 3 articles with over 200 citations, 2 articles with over 100 citations

SELECTED NEW FINDINGS OF THE DEPARTMENT

• Alarmins (or DAMPs: danger associated molecular patterns molecules) involved in atherosclerosis include but are not limited to: **HSPs 27, 60, 70, 90, Galectin-3, Annexin A1, Serpin H1, Histone H4 and H1.4**. Their abundance and the complex inflammatory environment generated by hyperlipidaemia are major risk factor for atherosclerosis.

• Mass Spectrometry based proteomics data support the hypothesis that caveolae interact with **cytoskeleton and other structural proteins** (actin, annexin II, filamin and dynamin) and **regulate the transport of macromolecules and the caveolae budding** under high fat stress.

• **HMGB1 protein is an active regulator** of the **vascular barrier** that modulates the expression of specific adhesion molecules for monocytes and macrophages on the endothelial cells surface.

• Mass spectrometry proteomic analysis designated a specific pattern of **S100 family proteins** in the pancreatic cancer.

• The hyperlipidaemic stress induced significant changes in the membrane-cytoskeleton proteome. At least 29 new identified proteins take part in: Regulation of the actin cytoskeleton, Focal adhesion and Adherens junction signalling pathways, **proving membrane-cytoskeleton tight coupling**.

• **Folic acid** is avidly taken up by **activated macrophages** in experimental hyperlipidaemia.

• Altered expression of endoplasmic reticulum **molecular chaperone** (HSPs: Heat Shock Proteins) are potential **active factors in thyroid tumorigenesis**; among them BiP and GRP94 act as biomarkers that discriminate benign follicular thyroid adenoma (FTA) over follicular variant of papillary thyroid carcinoma (FVPTC).

• Increased expression of **HMGB1 protein modulate** the inflammation both in experimental atherosclerosis and diabetes through **RAGE/pAKT1/beta-catenin pathway.**

SELECTED PREVIOUS RESEARCH PROJECTS/ PUBLICATIONS

(In collaboration with former research staff)

• **Endothelial cell receptors; Transport of macromolecules in vascular cells.**
Publications: Antohe et al., Microcirculation Endothelium and Lymphatics, 1986, 1988; Vasile et al., Atherosclerosis, 1989; J Submicrosc. Cytol. Pathol., 1991; Antohe et al., Eur. J Cell Biol.,1993,1999; Antohe and Poznansky, Pharmaceutical Enzymes, 1997; Antohe et al., Hum. Immunol., 2001; Borvac et al., Int Immunol.,1998; Firan et al., Int Immunol., 2001; Antohe et al., Endothelium., 1997; Dobrila et al., Int Immunol., 1992; Antohe et al., Cell Tissue Res., 2005.

• **Albumin binding proteins function in receptor mediated binding and transcytosis of albumin across endothelial cells**.
Publications: Antohe et al. Eur J Cell Biol., 1991, 1993; Georgescu et al. Physiologie, 1986; Heltianu et al., Eur. J Cell Biol. 1994 and Microvasc Res., 1989; Radulescu et al.,Rev.Roum.Biochim.,1997; Antohe et al., Eur J Cell Biol., 1998.

• **Endothelial heart-type fatty acid binding proteins (FABP) are the main carriers for fatty acids.**
Publications: Antohe et al., Eur J Cell Biol.,1991;1998; Antohe et al., J Liposome Res., 2004.

• **Human placental endothelial cells express neonatal receptors (FcRn) which discriminate and monitor the intracellular pathway of IgG.**
Publications: Jinga et al., Placenta, 2000; Radulescu et al., Hum Immunol., 2004; Antohe et al., Hum Immunol., 2001, 2004.

• **Low density lipoprotein (LDL) binding induces asymmetric redistribution of LDL receptors in endothelial cells**.
Publications: Antohe et al., Endothelium: J of Endothelial Cell Res., 1997; Antohe et al., Eur J Cell Biol., 1999.

• **Monoclonal antibodies as therapeutic tools.**
Publications: Radulescu et al., Current Problems in Cell and Molecular Biology, 2001; Antohe et al., J Liposome Res., 2004; Radulescu et al.,Med Sci Monit., 2004 and Hum Immunol., 2004.

• **Role of the folic acid receptors in the pathobiology of cardiovascular diseases.**
Publications: Antohe et al., Cell and Tissue Research, 2005; Antohe, Archives of Physiology and Biochemistry, 2006.

• **Hyperlipidemia induces endothelial cell dysfunction. Cellular and molecular mechanisms involved in the atherosclerotic plaques development**. Project PN II-IDEI-159/2007-2010.
Publications: Radulescu et al., Electrophoresis-Tech. Note, 2003; Antohe et al., Atherosclerosis Suppl., 2006, 2008; Ivan et al., J of Receptors and Signal Transduction, 2010; Uyy et al., Microvasc. Res., 2010; Haraba et al., Int. J of Cardiology, 2011; Haraba et al., Cell and Tissue Research, 2011; Haraba and Antohe, Digest J of Nanomaterials and Biostructures, 2011.

• **Eye dysfunction associated with inflammatory systemic disease.**
Publications: Cojocaru et al., Annals of the Rheumatic Diseases, 2004 and 2006; Oftalmologia, 2006; Cojocaru et al., Digest J of Nanomaterials and Biostructures, 2011.

• **Improvement of the diagnostic and follow-up protocols of differentiated thyroid cancer with new markers for a better treatment outcome, prognosis and quality of life**. Project No 135/2012 **GENITIR**, PN-II-PT-PCCA-2011-3, in collaboration with National Institute of Endocrinology "C. I. Parhon".
Publications: Uyy el al., J of Proteome Research, 2016; Baciu et al Roumanian reports in Physiscs, 2017; Popa et al., J of Molecular Endocrinology, 2018.

• **Mass spectrometry analysis of human pancreatic adenocarcinoma cell line (BxPc3) and tissue**. Project No 90/2012 **S100MAP**, PN-II-PT-PCCA-201-3, in collaboration with Fundeni Clinical Institute.
Publications: Antohe, Acta Endocrinologica 2015; Carmen C. Diaconu CC, Antohe F. et al., Patent No RO132002-A0, 2017; Nastase et al., J Transl. Med. Res., 2016; Ilie et al., FEBS J, 2014; Ivan et al., Cajal Symposium, 2011, 2012, 2014.

• **The proteome of new regenerated tissue induced by implants with bio-functional surface which are able to trigger certain healing phases typical for injured bone tissues**. Project No 90/2012 **FABIO3D**, PN-II-PT-PCCA-2011-3, in collaboration with National Institute for Research and Development of Materials Physics.
Publications: Boteanu et al., 2019 in preparation; Grumezescu et al., International J of Pharmaceutics, 2017; Socol et al., Digest J Nanomaterials and Biostructures, 2013; Antohe et al., Int. Winter School on Bioelectronics, 2014; Gadher SJ et al., Expert Rev Proteomics, 2018.

• **Cellular and molecular mechanisms that govern the molecular alteration in response to pathological stimuli in vascular cells by applying mass spectrometry based proteomics**:
analytical and functional proteomics to identify alarmins as biomarkers to be used in clinical practice.
Publications: Suica et al., Proteome science, 2015, BBA-Proteins and Proteomics, 2016; Uyy et al., Romanian reports in physics, 2017, Cell and Tissue Research, 2013; Boteanu et al., J of Proteomics 2017, Archives of Biochemistry and Biophysics, 2015, Cell and Tissue Research 2011, Int. J of Cardiology 2011; Gadher SJ et al., Expert Rev Proteomics, 2015-2019.