DESPINA SANOUDOU, PHD FACMG CIBIOL
7-PAGE CURRICULUM VITAE

ACADEMIC POSITIONS

2015 – to date	ASSOCIATE PROFESSOR, CLINICAL GENOMICS AND PHARMACOGENOMICS UNIT, 4TH DEPARTMENT OF INTERNAL MEDICINE, MEDICAL SCHOOL, UNIVERSITY OF ATHENS, GREECE
2011 – to date	AFFILIATED FACULTY MEMBER, MOLECULAR BIOLOGY DIVISION, BIOMEDICAL RESEARCH FOUNDATION OF THE ACADEMY OF ATHENS, GREECE
2014-2017	HONORARY SENIOR RESEARCH FELLOW IN THE GENETICS AND IMAGING SECTION, NATIONAL HEART AND LUNG INSTITUTE, FACULTY OF MEDICINE, IMPERIAL COLLEGE LONDON, UK
2012– 2015	AFFILIATED FACULTY MEMBER, MOLECULAR, CARDIOMYOPATHY CLINIC, 3RD DEPARTMENT OF CARDIOLOGY, MEDICAL SCHOOL, UNIVERISITY OF ATHENS
2010– 2015	ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACOLOGY, MEDICAL SCHOOL, UNIVERSITY OF ATHENS
2007-2010	RESEARCHER C (ASSISTANT PROFESSOR), MOLECULAR BIOLOGY DIVISION, BIOMEDICAL RESEARCH FOUNDATION OF THE ACADEMY OF ATHENS, GREECE
2005-2006	VISITING SCHOLAR, DEPARTMENT OF MEDICINE, BOSTON UNIVERSITY SCHOOL OF MEDICINE, BOSTON, U.S.A.
2003-2006	RESEARCHER D (INSTRUCTOR LEVEL), MOLECULAR BIOLOGY DIVISION, BIOMEDICAL RESEARCH FOUNDATION OF THE ACADEMY OF ATHENS, GREECE
2003	INSTRUCTOR, DEPARTMENT OF PEDIATRICS, HARVARD MEDICAL SCHOOL, BOSTON, U.S.A.
2003	INSTRUCTOR, DEPARTMENT OF MEDICINE, DIVISION OF GENETICS, CHILDREN'S HOSPITAL, BOSTON, U.S.A.
2002-2003	POSTDOCTORAL RESEARCH FELLOW, DEPARTMENT OF MEDICINE, DIVISION OF GENETICS, CHILDREN'S HOSPITAL, BOSTON, U.S.A.
2002-2003	POSTDOCTORAL RESEARCH FELLOW, DEPARTMENT OF PEDIATRICS, HARVARD MEDICAL SCHOOL, BOSTON, U.S.A.

OTHER POSITIONS

2014 - 2017	MEMBER OF THE BOARD OF DIRECTORS, KARDIATEC CO, ATHENS, GREECE
2012- 2015	CO-ORDINATOR OF INTERNATIONAL GENOMICS/PHARMACOGENOMICS PROGRAM OF THE MAGDI YACOUB RESEARCH NETWORK, LONDON, UK
2008-2011	MENTOR TO UNDERGRADUATE STUDENTS, ALUMNI MENTOR PROGRAM, UNIVERSITY OF HERTFORDSHIRE, UK
2006	SABBATICAL, DEPARTMENT OF PATHOLOGY, BRIGHAM AND WOMEN'S HOSPITAL, HARVARD MEDICAL SCHOOL, BOSTON, U.S.A.
2001	CLINICAL MOLECULAR DIAGNOSTICS FELLOW, BRIGHAM AND WOMEN'S HOSPITAL, BOSTON, USA
2001	CLINICAL MOLECULAR DIAGNOSTICS FELLOW, CHILDREN'S HOSPITAL, BOSTON, USA
2002	CLINICAL MOLECULAR DIAGNOSTICS FELLOW, GENZYME INC., FRAMINGHAM, USA
2002	CLINICAL MOLECULAR DIAGNOSTICS FELLOW, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, USA

EDUCATION

1999	PH.D. IN MOLECULAR CYTOGENETICS, UNIVERSITY OF CAMBRIDGE, UK
1996	BSC IN APPLIED BIOLOGY (MOLECULAR BIOLOGY-HONORS), UNIVERSITY OF HERTFORDSHIRE, UK

PROFESSIONAL CERTIFICATION

2000-2002	BOARD CERTIFICATION IN CLINICAL MOLECULAR DIAGNOSTICS, AMERICAN BOARD OF MEDICAL GENETICS, USA

GRANTS

2019-2023	Leducq Foundation, "Cure Phospholamban induced cardiomyopathy (CURE-PLaN)"
2018-2019	Operational Programme Human Resources Development, Education and Lifelong Learning, Co-financed by Greece and the European Union, contract no.: (MIS) 5006782 "In vitro and in vivo assessment of reconstituted HDL containing apoE3 against atherosclerosis"
2017	Amgen Social Responsibility Grant for High School Outreach Program on Biosciences
2016-2017	Hellenic Cardiological Society Research Award "Evaluation of new mechanisms of post-translational modifications as therapeutic targets against arrhythmias"
2012-2016	7th Framework Programme-European Union, contract no.: HEALTH-F2-2012-278611 "NOX enzymes as mediators of inflammation-triggered neurodegeneration: modulating NOX enzymes as novel therapies (NEURINOX)"
2014-2015	National Action "Aristeia II", Greek Ministry of Education and Religion – General Secretariat for Research and Technology, contract no.:5368 "Aberrations in Ca homeostasis as the molecular basis of arrhythmogenesis and evaluation of novel targeted treatments (CALCIRHYTHM)"
2014-2015	Fondation Sante "Determine the mechanisms underlying arrhythmogenesis by the human variant S96A in the histidine-rich calcium binding protein"
2013-2014	Hellenic Cardiological Society Research Award "Investigation of novel pharmaceutical compounds against cardiac arrhythmias, in a novel mouse model of ventricular arrhythmias"
2012-2016	National Action "Cooperation", Greek Ministry of Development, "Development of Novel Diagnostics and Treatment for Cardiomyopathy and Heart Failure (TREAT-HEART)"
2012-2016	National Action "Thalis", Greek Ministry of Education/ European Union "Structure-function relation, regulation and genetic variation of the high density lipoprotein (HDL): potential in the prevention and treatment of coronary disease"
2012-2015	National action "Cooperation", Greek Ministry of Development no: 09ΣΥΝ-21-1003 "Development and Screening of Novel beta Amyloid Peptide Inhibitors for Alzheimer's Disease (TreatAD)"
2012-2014	7th Framework Programme-European Union, contract no.: FP7-ICT-2011-318652 "BIOASQ: A challenge on large-scale biomedical semantic indexing and question answering"
2011-2012	John John S. Latsis Public Benefit Foundation Research Grant "New targeted treatments against cardiac arrhythmias"
2009-2014	7th Framework Programme-European Union, contract no.: HEALTH-F2-2009-241526 "Identification and therapeutic targeting of common arrhythmia trigger mechanisms (EUTrigTreat)".
2009-2010	Hellenic Cardiological Society Research Award "Cofilin 2: a new diagnostic marker and therapeutic target for cardiomyopathies?"
2008-2009	Hellenic Cardiological Society Research Award "New proteins involved in the development of Heart Failure"
2007-2008	Hellenic Cardiological Society Research Award "Characterizing the role of MLP in Heart Failure"
2007-2010	6th Framework Programme-European Union "Functional genomics of inborn errors and therapeutic interventions in high density lipoprotein (HDL) metabolism"
2006-2007	Hellenic Cardiological Society Research Award "Evaluation of HAX-1 as a diagnostic marker and therapeutic target for heart failure"
2006-2008	International RTD Collaborations-Greek Ministry of Development/ European Union. "Models of Ubiquitin-proteasome dysfunction in mice"
2006-2008	Development Programmes for the Periphery, Greek Ministry of Development/ European Union. "Development of improved cardioprotective gene transfer approaches for cardiomyopathy treatment"

2005-2008	PENED-Greek Ministry of Development/European Union, contract no.: 03 ED 271 "Molecular diagnosis of micrometastatic disease in breast cancer using electronic DNA microarrays".

AWARDS–DISTINCTIONS

2006-2008, 2013-2017	**9 Awards** by the Hellenic Heart Failure Society
2013, 2016	**2 Awards** by the Hellenic Society for Lipidology, Atherosclerosis and Vascular Disease
2012, 2013	**2 Awards** by the Hellenic Society for Atherosclerosis
2009, 2011, 2013	**3 Awards** by the Hellenic Pharmacology Society
2012	Poster presentation Award. 21st Conference "Pathology Days", Greece
2010	21st International Biology Olympiad–Trainer Award by the Panhellenic Union of Bioscientists, Greece
2009	American Society of Human Genetics Award for Excellence in High school Outreach Initiatives and Activities at an International Level, USA
2008	Panhellenic Biosciences Association Award for contribution to bridging Education and Research and to the education of high-school students and teachers
2008	Honorary Award for Scientific Achievements in Molecular Cardiology by the Thirean Society for Sciences and Arts
2008	National Award, European Society of Human Genetics
2007	**UNESCO**-L'Oreal Award for "2007 Best Young Female Scientists in Greece"
2000	March of Dimes Birth Defects Foundation Award

TEACHING EXPERIENCE

2006-2017	15 TRAINING PROGRAMMES FOR PROFESSIONALS
2003-2017	22 POSTGRADUATE (MSc) COURSES (University of Athens: Depts. Medicine, Pharmacy, Chemistry, Clinical Biochemistry, Nursing, Biology, Informatics; University of Crete: Dept. Medicine)
2012-2015	3 POSTGRADUATE summer courses
2003-2016	12 UNDERGRADUATE courses
2004-2017	6 High school outreach and biosciences training programs

LAB SUPERVISION

DIRECT SUPERVISION
9 Post-Doc fellows,
8 PHD students,
15 MSC students,
16 final year undergraduate students

ADVISORY / EVALUATION COMMITTEES
15 PHD students,
12 MSC students

GRANT EVALUATOR

2006-2018 HORIZON 2020 of the European Union, European Research Council, 7th Framework Programme of the European Union, 6th Framework Programme of the European Union, European Institute of Innovation and Technology (EIT), Italian Telethon Foundation, French Agence Contre Les Myopathies, A*MIDEX University Foundation of Aix-Marseille University-France, Belgian Fund for Scientific Research (FNRS), Cyprus Research Promotion Foundation, Lithuanian Research Council, Polish National Center for Research and Development, MIT Enterprise Forum – Greece Startup Competition, Greek General Secretariat for Research and Technology, Foundation for Greek Governmental Scholarships (IKY), Hellenic Foundation for Research and Innovation, Greek Association of Pharmaceutical Enterprises (SFEE) Innovation Project

BOOK EDITOR

2012 "Clinical applications of pharmacogenetics". InTech, Croatia. ISBN:978-953-51-0389-9 (http://www.intechopen.com/books/clinical-applications-of-pharmacogenetics). Open Access // **(downloaded >40,500 times)**

EDITORIAL BOARDS

Associate Editor / Guest Editor

Metabolism *(IF: 5.963)*
Continuing Cardiology Education Journal
Current Pharmaceutical Design (Executive Guest Editor)
Journal of Precision Medicine (Executive Guest Editor)
Central European Journal of Medicine (Section Editor for Genetics)

Member

Gene
Pharmacology Research and Perspectives
J. Pharmacogenomics & Pharmacoproteomics
Global J. of Human Anatomy and Physiology
World Journal of Biological Chemistry
Physiological Genomics
Frontiers in Pharmacogenetics and Pharmacogenomics
World J. of Pharmacology
Stem Cell Discovery
International J. of Systems Biology and Biomedical Technologies
Advances&Perspectives in Cardiology (Greek)

REVIEWER IN PEER-REVIEW JOURNALS

41 International Journals *(including Human Molecular Genetics, Journal of the American College of Cardiology, European Journal of Heart Failure, Annals of Neurology, FASEB J., and more)*

INVITED SPEAKER

188 International and National conferences / seminars

SESSION CHAIR

11 International & **4** Greek conferences

EVENT ORGANISATION

20 Conferences & **14** Post-graduate courses/seminars

PATENTS

"The protein HAX-1 binds phospholamban, the primary regulator of cardiac function". No 20060100211 /1005699. Greek Patent Office. (2007)

PUBLIC DATABASES CONTRIBUTIONS

GenBank accession: FJ000070
Definition: Homo sapiens histidine rich calcium binding protein (HRC) gene, complete cds; and protein tyrosine phosphatase (PPFIA3) gene, partial sequence. Arvanitis DA, Sanoudou D, Kolokathis F, Vafiadaki E, Papalouka V, Kontrogianni-Konstantopoulos A, Theodorakis GN, Paraskevaidis IA, Adamopoulos S, Dorn GWII, Kremastinow DT, Kranias EG.

GenBank accession: JN898958
Definition: Homo sapiens CSRP3 cysteine and glycine-rich protein 3 (cardiac LIM protein) isoform mRNA. Vafiadaki E, Papalouka V, Arvanitis DA, Terzis G, Spengos K, Kranias EG, Manta P, Sanoudou D.

Wikipedia, "**CSRP3",** https://en.wikipedia.org/wiki/CSRP3

PUBLICATION SUMMARY

Peer reviewed Publications in PubMed: **80**
(Original research: **61** Reviews: **19**) / (First author: **14** Last author: **18**)
Peer reviewed Publications in Greek Journals: **6**
Books: **1 (downloaded >40,500 times)**

Chapters in Books: **9** (International) & **10** (Greek)
Abstracts in Scientific Meetings: **212**
H-Index (Google Scholar): **34**
Citations (Google Scholar): **3,735**

SELECTED PUBMED PUBLICATIONS

1. Liu GS, Zhu H, Cai WF, Wang X, Jiang M, VafiadakiE, Nicolaou P, Lam CK, Gardner G, Adly G, **Sanoudou D**, Liang Q, Rubinstein J, Fan GC, Kranias EG. "Regulation of Beclin-Mediated Autophagy by Hsp20: Insights from a Human Hsp20 S10F Mutant". Autophagy. 2018;14(1):80-97. **(IF: 8.593)**
2. Arvanitis DA, Vafiadaki E, Papalouka V, **Sanoudou D**. "Muscle Lim Protein binds Myosin Binding Protein C and through it regulates muscle differentiation". Biochimica & Biophysica Acta. 2017 Aug 31. Pii: S0167-4889(17)30226-4. **(IF: 5.547)**
3. Tzimas C, Johnson DM, Santiago DJ, Vafiadaki E, Arvanitis DA, Davos CH, Varela A, Athanasiadis NC, Dimitriou C, Katsimpoulas M, Sonntag S, Kryzhanovska M, Shmerling D, Lehnard SE, Sipido KR, Kranias EG, **Sanoudou D**. "Impaired calcium homeostasis is associated with sudden cardiac death and arrhythmias in a genetic equivalent mouse model of the human HRC-Ser96Ala variant". Cardiovasc Res. 2017 Sep 1;113(11):1403-1417. **(IF: 5.878)**
4. Tsompanidis A, Vafiadaki E, Blüher S, Kalozoumi G, Mantzoros CS*, **Sanoudou D***. "Ciliary neurotrophic factor upregulates follistatin and Pak1, causes overexpression of muscle differentiation related genes and downregulation of established atrophy mediators in skeletal muscle". Metabolism. 2016 Jun;65(6):915-25. **(IF: 5.777)**
5. Nuvolone M, Hermann M, Sorce S, Russo G, Tiberi C, Schwarz P, Minikel E, **Sanoudou D**, Pelczar P, Aguzzi A. "Strictly co-isogenic C57BL/6J-Prnp-/- mice: A rigorous resource for prion science". J Exp Med. 2016 Mar 7;213(3):313-27. **(IF: 12.515)**
6. Herrmann US, Sonati T, Falsig J, Reimann RR, Dametto P, O'Connor T, Li B, Lau A, Hornemann S, Sorce S, Wagner U, **Sanoudou D**, Aguzzi A. "Prion infections and anti-PrP antibodies trigger converging neurotoxic pathways". PLoS Pathogens. 2015 Feb 24;11(2):e1004662. (IF: 8.057)
7. Tzimas C, Terrovitis J, Lehnart SE, Kranias EG, **Sanoudou D**. "Calcium/calmodulin-dependent protein kinase II (CaMKII) inhibition ameliorates arrhythmias elicited by junctin ablation under stress conditions". Heart Rhythm. 2015 Jul;12(7):1599-610. **(IF: 5.076)**
8. Bibli SI, Andreadou I, Chatzianastasiou A, Tzimas C, **Sanoudou D**, Kranias E, Brouckaert P, Coletta C, Szabo C, Kremastinos DT, Iliodromitis EK, Papapetropoulos A. "Cardioprotection by H2S engages a cGMP-dependent protein kinase G/phospholamban pathway". Cardiovascular Research 2015 Jun 1;106(3):432-42. **(IF: 5.940)**
9. Karakikes I, Stillitano F, Nonnenmacher M, Tzimas C, **Sanoudou D**, Termglinchan V, Kong CW, Rushing S, Hansen J, Ceholski D, Kolokathis F, Kremastinos D, Katoulis A, Ren L, Cohen N, Gho JM, Tsiapras D, Vink A, Wu JC, Asselbergs FW, Li RA, Hulot JS, Kranias EG, Hajjar RJ. "Correction of human phospholamban R14del mutation associated with cardiomyopathy using targeted nucleases and combination therapy". Nature Communications 2015 Apr 29;6:6955. **(IF: 11.470)**
10. Haghighi K, Pritchard TJ, Liu GS, Singh VP, Bidwell P, Lam CK, Vafiadaki E, Das P, Ma J, Kunduri S, **Sanoudou D**, Florea S, Vanderbilt E, Wang HS, Rubinstein J, Hajjar RJ, Kranias EG. "Human G109E-inhibitor-1 impairs cardiac function and promotes arrhythmias". J Mol Cell Cardiol. 2015 Dec;89(Pt B):349-59. **(IF: 4.655)**
11. **Sanoudou D**, Kolokathis F, Arvanitis D, Al-Shafai K, Krishnamoorthy N, Buchan RJ, Walsh R, Tsiapras D, Barton PJ, Cook SA, Kremastinos D, Yacoub M. "Genetic modifiers to the PLN L39X mutation in a patient with DCM and sustained ventricular tachycardia?". Glob Cardiol Sci Pract. 2015 Jul 3;2015(2):29

12. Vafiadaki E, Arvanitis DA, Papalouka V, Terzis G, Roumeliotis TI, Spengos K, Garbis SD, Manta P, Kranias EG, **Sanoudou D**. "Muscle lim protein isoform negatively regulates striated muscle actin dynamics and differentiation". FEBS Journal. 2014 Jul;281(14):3261-79. **(IF: 4.001)**
13. Vafiadaki E, Arvanitis DA, **Sanoudou D**, Kranias EG. "Identification of a Protein Phosphatase-1/Phospholamban Complex That Is Regulated by cAMP-Dependent Phosphorylation". PLoS One. 2013 Nov 14;8(11):e80867 **(IF: 4.411)**
14. Psarras S, **Sanoudou D***, Mavroidis M*, Xanthou G*, Panoutsakopoulou V, Capetanaki Y. 2012. "Regulation of adverse remodelling by osteopontin in a genetic heart failure model". Eur Heart J. 2012 Aug;33(15):1954-63.**equal contribution* **(IF: 7.286)**
15. Wang HS, Arvanitis DA, Dong M, Niklewski PJ, Zhao W, Lam CK, Kranias EG, **Sanoudou D**. "SERCA2a Superinhibition by Human Phospholamban Triggers Electrical and Structural Remodelling in Mouse Hearts". Physiol Genomics. 2011 Apr; 43(7):357-64. **(IF: 4.667)**
16. Qian J, Vafiadaki E, Florea SM, Singh VP, Song W, Kung Lam C, Wang Y, Yuan Q, Pritchard TJ, Cai W, Haghighi K, Rodriguez P, Wang HS, **Sanoudou D**, Fan GC, Kranias EG. "Small Heat Shock Protein 20 Interacts With Protein Phosphatase-1 and Enhances Sarcoplasmic Reticulum Calcium Cycling". Circ Res. 2011 Jun 10;108(12):1429-38. **(IF: 9.504)**
17. **Sanoudou D**, Duka A, Drosatos K, Hayes KC, Zannis VI. "Role of Esrrg in the fibrate-mediated regulation of lipid metabolism genes in human ApoA-I transgenic mice". Pharmacogenomics J. 2010 Jun;10(3):165-79. **(IF: 5.435)**
18. Al-Qusairi L, Weiss N, Toussaint A, Berbey C, Messaddeq N, Kretz C, **Sanoudou D**, Beggs AH, Allard B, Mandel JL, Laporte J, Jacquemond V, Buj-Bello A. 2009. "T-tubule disorganization and defective excitation-contraction coupling in muscle fibers lacking myotubularin lipid phosphatase." PNAS. 2009 Nov 3;106(44):18763-8. (**IF:10.700)**
19. Papalouka V, Arvanitis DA, Vafiadaki E, Mavroidis M, Papadodima SA, Spiliopoulou CA, Kremastinos DT, Kranias EG, **Sanoudou D**. 2009. "Muscle LIM protein interacts with cofilin 2 and regulates F-actin dynamics in cardiac and skeletal muscle." Mol Cell Biol. 2009 Nov;29(22):6046-58. (**IF: 6.420)**
20. Vafiadaki E, Arvanitis DA, Pagakis SN, Papalouka V, **Sanoudou D**, Kontrogianni-Konstantopoulos A, Kranias EG. 2009. "The anti-apoptotic protein HAX-1 interacts with SERCA2 and regulates its protein levels to promote cell survival". Molecular Biology of the Cell, 20(1):306-18. (IF: 5.942)
21. Garbis S, Tyritzis S, Roumeliotis T, Zerefos P, Giannopoulou EG, Vlahou A, Kossida S, Diaz J, Vourekas S, Tamvakopoulos C, Pavlakis K, **Sanoudou D**, Constantinides C. 2008. "Search for potential markers for prostate cancer diagnosis, prognosis and treatment in clinical tissue specimens using amine-specific isobaric tagging (iTRAQ) with two-dimensional liquid chromatography and tandem mass spectrometry". Journal of Proteome Research, 7(8):3146-58. **(IF: 5.151)**
22. Arvanitis DA, **Sanoudou D**, Kolokathis F, Vafiadaki E, Papalouka V, Kontrogianni-Konstantopoulos A, Theodorakis GN, Paraskevaidis I, Adamopoulos S, Dorn II GW, Kremastinos D, Kranias EG. 2008. "The Ser96Ala variant in histidine-rich calcium-binding protein is associated with life-threatening ventricular arrhythmias in idiopathic dilated cardiomyopathy". European Heart Journal, (20):2514-25. **(IF: 7.286)**
23. Drosatos K, **Sanoudou D**, Kypreos EK, Kardassis D, Zannis VI. 2007. "A dominant negative form of the transcription factor c-Jun affects genes that have opposing effects on lipid homeostasis in mice". Journal of Biological Chemistry, 282(27):19556-64. **(IF: 5.865**)
24. Arvanitis DA, Vafiadaki E, Mitton B, Gregory KN, Kranias EG***, Sanoudou D***. 2007. "Histidine-rich calcium binding protein a novel binding partner of SERCA2 in human heart". American Journal of Physiology Heart and Circulatory Physiology, 293(3):H1581-9. **equal contribution* **(IF: 3.568)**
25. **Sanoudou D**, Corbett MA, Han M, Ghoddusi M, Nguyen MT, Vlahovich N, Hardeman EC, Beggs AH. 2006. "Skeletal muscle repair in a mouse model of nemaline myopathy". Human Molecular Genetics, 15(17):2603-12. **(IF: 7.764)**

26. Vafiadaki E, **Sanoudou D**, Arvanitis DA, Catino DH, Kranias EG, Kontrogianni-Konstantopoulos A. 2006. "Phospholamban interacts with HAX-1, a mitochondrial protein with anti-apoptotic function". Journal of Molecular Biology, 367(1):65-79. **(IF: 5.229)**
27. **Sanoudou D**, Haslett JN, Kho A, Guo O, Gazda H, Greenberg SA, Lidov HGW, Kohane IS, Kunkel LM, Beggs AH. 2003. "Expression profiling reveals altered satellite cell numbers and glycolytic enzyme transcription in nemaline myopahty muscle". PNAS, 100 (8); pp. 4666-4671. **(IF: 10.700)**
28. Haslett JN, **Sanoudou D**, Kho A, Bennett RR, Greenberg SA, Kohane IS, Beggs AH, Kunkel LM. 2002."Gene expression comparison of biopsies from Duchenne muscular dystrophy and normal skeletal muscle". PNAS, 99 (23); pp. 15000-15005. **(IF: 10.700)**