



## George Kulik, Ph.D.

### Associate Professor of Cancer Biology

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Dr. George Kulik earned his graduate degree at the Institute of Experimental Pathology in Kiev, Ukraine and obtained post-doctoral training in the Imperial Cancer Research Fund (London, UK) and University of Virginia (Charlottesville, USA). As a post-doctoral fellow Dr. Kulik identified the critical role of the **PI3K/AKT** signaling module in apoptosis inhibition by IGF-1. The importance of PI3K/AKT signaling for cell survival was later confirmed in numerous publications and now this signaling pathway is a major focus of leading pharmaceutical companies. He then moved to Wake Forest University School of Medicine where his laboratory investigated the mechanisms by which cancer cell signaling pathways become integrated into a robust regulatory network, and the ways this knowledge can be utilized to improve cancer diagnosis and therapy. Dr. Kulik group has made discoveries that provide insight into the linkage between emotional stress and the regulation of anti-apoptotic pathways in tumors.

Research of Dr. Kulik integrates a variety of methods ranging from molecular biology and proteomics to transgenic mouse models of prostate cancer, bioluminescent imaging and behavioral studies in mice. Basic science findings on signaling network that controls apoptosis in prostate cancer cells made in his laboratory became a basis for translational projects that aim to examine effects of psychological stress on activation of neuroendocrine pathways in prostates of men and on prostate cancer progression and develop prostate tumor-specific inhibitors of anti-apoptotic signaling pathways. These projects are conducted in collaborations with experts in medicinal chemistry, *in silico* drug design, toxin targeted therapies, systems biology and clinical urology.

Research program of Dr. Kulik is supported by US Department of Defense Prostate Cancer Research Program and National Cancer Institute.

Results from Dr. Kulik laboratory are published in high-impact journals including Journal of Biological Chemistry, Molecular and Cellular Biology, Cancer Research and Journal of Clinical Investigations. His publications were cited over 1800 times in scientific literature, featured on the covers of Cancer Research and Journal of Medicinal Chemistry and ranked 4 among **top 10** Brain Science And Psychology Studies by **Forbes** in December 2013.

Dr. Kulik presented his research at national and international meetings including plenary sessions at annual meetings of Psychoneuroimmunology Research Society, American Association for Cancer Research (AACR) and Academy of Behavioral Medicine.

## **B. Selected peer-reviewed publications (Over 1800 citations in Scopus as of 1/Febr/16)**

- 1) Jonathan P. Carson, Marcelina Behnam, Jennifer Sutton, Chunying Du, Xiaodong Wang, Donald Hunt, Michael J. Weber and **George Kulik\***. (2002) Smac is required for cytochrome c-induced apoptosis in prostate cancer LNCaP cells. *Cancer Res.* 62: 18-23. <http://www.ncbi.nlm.nih.gov/pubmed/11782351>
- 2) Konduru S. R. Sastry, Adrienne Joy Smith, Yelena Karpova, Sandeep Robert Datta, and **George Kulik\***. (2006) Diverse anti-apoptotic signaling pathways activated by VIP, EGF and PI3K in prostate cancer cells converge on BAD. *J Biol Chem.* 281(30):20891-901. <http://www.ncbi.nlm.nih.gov/pubmed/16728406>
- 3) Konduru S. R. Sastry, Yelena Karpova, and **George Kulik\***. (2006) Epidermal Growth Factor Protects Prostate Cancer Cells from Apoptosis by Inducing BAD Phosphorylation via Redundant Signaling Pathways. *J Biol. Chem.* 281(37):27367-77 <http://www.ncbi.nlm.nih.gov/pubmed/16847055>
- 4) Sastry KS, Karpova Y, Prokopovich S, Smith AJ, Essau B, Gersappe A, Carson JP, Weber MJ, Register TC, Chen YQ, Penn RB, **Kulik G\***. (2007) Epinephrine protects cancer cells from apoptosis via activation of PKA and BAD phosphorylation. *J Biol. Chem.* May 11;282(19):14094-100. <http://www.ncbi.nlm.nih.gov/pubmed/17353197>
- 5) Isabelle M. Berquin, Younong Min, Ruping Wu, Jiansheng Wu, Donna Perry, J. Mark Cline, Mike J. Thomas, Todd Thornburg, **George Kulik**, Iris J. Edwards, Ralph D'Agostino Jr., Adrienne Smith, Hao Zhang, Hong Wu, Jing X. Kang and Yong Q. Chen. (2007) Modulation of Prostate Cancer Genetic Risk by Omega-3 and Omega-6 Fatty Acids. *J Clin Invest.* 117(7):1866-1875. <http://www.ncbi.nlm.nih.gov/pubmed/17607361>
- 6) Daniele Baiz, Tanya A. Pinder, Sazzad Hassan, Yelena Karpova, Freddie Salsbury, Mark E. Welker and **George Kulik\*** (2012) Synthesis and characterization of a novel prostate cancer-targeted PI3 Kinase inhibitor prodrug. *J.Med.Chem.* 55: 8038-8046. <http://www.ncbi.nlm.nih.gov/pubmed/22924393>
- 7) Sazzad Hassan; Yelena Karpova; Daniele Baiz, Dana Yancey, Ashok Pullikuth, Anabel Flores, Thomas Register, Mark Cline, Ralph D'Agostino Jr; Nika Danial, Sandeep Robert Datta and **George Kulik\***. (2013) Behavioral stress accelerates prostate cancer development in mice. *J Clin Invest.*;123(2):874–886. <http://www.ncbi.nlm.nih.gov/pubmed/23348742>
- 8) **George Kulik\*** (2013) Targeting psycho-emotional stress to treat prostate cancer. *Asian J Androl.* May;15(3):362-3 <http://www.ncbi.nlm.nih.gov/pubmed/23584381>
- 9) . Mark Welker\* and **George Kulik\***. (2013) Recent Syntheses of PI3K/Akt/mTOR Signaling Pathway Inhibitors. *Bioorganic & Medicinal Chemistry* 21 (2013), pp. 4063-4091 <http://www.ncbi.nlm.nih.gov/pubmed/23735831>
- 10) Daniele Baiz, Sazzad Hassan, Young A Choi, Anabel Flores, Yelena Karpova, Dana Yancey, Ashok Pullikuth, Guangchao Sui, Michel Sadelain, Waldemar Debinski and **George Kulik\***. (2013) Combination of the PI3K Inhibitor ZSTK474 with a PSMA-Targeted Immunotoxin Accelerates Apoptosis and Regression of Prostate Cancer. *Neoplasia* 2013 Oct;15(10):1172-83. <http://www.ncbi.nlm.nih.gov/pubmed/24204196>
- 11) Xiaoqiang Sun, Jiguang Bao, Kyle C. Nelson, King Chuen Li, **George Kulik\***, Xiaobo Zhou\*.

(2013) Systems Modeling of Anti-apoptotic Pathways in Prostate Cancer: Psychological Stress Triggers a Synergism Pattern Switch in Drug Combination Therapy, PLOS Computational Biology DOI: 10.1371/journal.pcbi.1003358. <http://www.ncbi.nlm.nih.gov/pubmed/24339759>

12) Konduru Sastry, Mariam Al Muftah, Pu Li, Moza Khalifa Al Kowari, Ena Wang, Dhanya Dhanya Kizhakayil, **George Kulik**, Francesco Marincola, Abdelali Haoudi, Lotfi Chouchane, and Awatef Chouchane. (2014) Targeting pro-apoptotic protein BAD inhibits survival and self-renewal of cancer stem cells. *Cell Death Differ.* 2014; 21: 1936-49. doi: 10.1038/cdd.2014.140. <http://www.ncbi.nlm.nih.gov/pubmed/25215949>

13) George Kulik\*. Personalized prostate cancer therapy based on systems analysis of apoptosis regulatory network. *Asian J Androl.* 2015 May-Jun;17(3):471-4. <http://www.ncbi.nlm.nih.gov/pubmed/25578933>

14) George Kulik\*. Precision therapy to target apoptosis in prostate cancer. *Experimental Oncology* 2014 Dec;36(4):226-30 <http://www.ncbi.nlm.nih.gov/pubmed/25537214>

15) Zhang Q, Wan M, Shi J, Horita DA, Miller LD, Kute TE, Kridel SJ, **Kulik G**, Sui G. Yin Yang 1 promotes mTORC2-mediated AKT phosphorylation. *J Mol Cell Biol.* 2016 Jan 13. pii: mjw002. [Epub ahead of print] PubMed PMID: 26762111.

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