

BIOGRAPHICAL SKETCH

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NAME Venu Raman		POSITION TITLE Associate Professor of Radiology	
eRA COMMONS USER NAME vrman2			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Bombay, India	B.Sc.	1982	Microbiology
University, Baroda, India	M.Sc.	1984	Biochemistry
University of New South Wales, Australia	Ph.D.	1991	Mol Biol./Biochem

A. Personal Statement

Dr. Raman is Associate Professor of Radiology and Oncology. Dr. Raman has gained significant recognition in the area of developmental breast cancer biology. His work on deciphering the role of HOXA5 and Twist in breast cancer formation is widely recognized both nationally and internationally. Dr. Raman is an expert developmental and cancer molecular biologist, who has worked in the molecular imaging field for ten years. Dr. Raman has significant experience in generating preclinical cancer xenograft models as well as developing chemotherapeutic molecules for treating cancers. He has been intimately involved with the JHU ICMIC since its inception, and has played a key role in the integration of molecular biology techniques with imaging.

B. Positions and Honors

Positions and Employment

1991-95	Postdoctoral Fellow, The Institute of Molecular and Cellular Biology, Indiana University.
1996-99	Research Fellow, The Johns Hopkins University, Baltimore, Maryland.
2000-06	Assistant Professor Radiology, The Johns Hopkins University, School of Medicine, Baltimore, Maryland.
2000-06	Assistant Professor Oncology, The Johns Hopkins University, School of Medicine, Baltimore, Maryland.
2007-present	Associate Professor Radiology, The Johns Hopkins University, School of Medicine, Baltimore, Maryland.
2007-present	Associate Professor Oncology, The Johns Hopkins University, School of Medicine, Baltimore, Maryland.

Honors

1987	Commonwealth Government Post-Graduate Research Scholarship, Australia.
1997	Outstanding Research Scientist Award at the Annual Oncology Symposia held at Johns Hopkins University.
1998	Outstanding Research Award presented at the Annual meeting of American Association For Cancer Research, New Orleans.
2007-present	Editorial Board- <i>Molecular Medicine Reports</i>

Patents

1. Exogenous Gene regulatory Systems- PL3646/92 (Australia-1991)-Inventors include: Venu Raman and Ronald Hill.
2. Efficient synthetic method for preparing chelating agent used in medical diagnosis and therapy. PCT number-64817PCT(71699) (USA-2007)-Inventors include: Peter Van Zijl, Assaf Gilad, Jeff Bulte, Mike McMahon, Paul Winnard, and Venu Raman.
3. Fused diimidazodiazepine compounds and methods of use and manufacture thereof. PCT/US2009/005273 (USA-2009)-Inventors include: Venu Raman and Ramachandran Hosmane.
4. Compositions and methods for characterizing breast cancer. PCT/US11/28358 (USA-2011)-Inventors include Venu Raman and Farhad Vesuna.

C. Selected Peer-reviewed Publications (Selected from over 65-peer reviewed publications) Most relevant to the current application

1. Winnard, P. Jr., Kluth, B. J. and Raman, V. Non-invasive optical tracking of red fluorescent protein expressing cancer cells in a model of metastatic breast cancer. *Neoplasia* 2006; 8:796-806.
2. Raman, V., Artemov, D., Pathak, A.P., Winnard, P. Jr., McNutt, S., Yudina, A., Bogdanov, A.Jr. and Bhujwalla, Z.M. Characterizing vascular parameters in hypoxic regions: A combined MR and optical imaging study of a human prostate cancer model. *Cancer Research* 2006; 66:9929-9936.
3. Winnard, P. Jr., Kluth, B. J. Kato, Y., Artemov, D. and Raman, V. Development of novel chimeric transmembrane proteins for multimodality imaging of cancer cells. *Cancer Biology and Therapy* 2007; 6:1889-1899.
4. Botlagunta, M., Vesuna, F., Mironchik, Y., Raman, A., Lisok, A., Winnard, P., Mukudam, S., van Diest, P., Chen, H.J., Farabaugh, P., Patel, H.A. and Raman, V. Oncogenic role of DDX3 in breast cancer biogenesis. *Oncogene* 2008; 28:3912-3922. Not supported by NIH funding.
5. Vesuna, F., Lisok, A., Kimble, B. and Raman, V. Twist modulates breast cancer stem cells by transcriptional regulation of CD24 expression. *Neoplasia* 2009; 12:1318-1328. PMID:PMC2794513.

Additional recent publications of importance to the field (in chronological order)

1. Raman, V., Martensen, S. A., Reisman, D., Evron, E., Odenwald, W. F., Jaffee, E., Marks, J. and Sukumar, S. Compromised HOXA5 function can limit p53 expression in human breast tumours. *Nature* 2000; 405:974-978. Not supported by NIH funding.
2. Stasinopoulos, I., Mironchik, Y., Raman, A., Wildes, F., Winnard, P. Jr. and Raman, V. HOXA5-Twist interaction alters p53 homeostasis in breast cancer cells. *Journal of Biological Chemistry* 2005; 280:2294-2299.
3. Mironchik, Y., Winnard, P. Jr., Vesuna, F., Kato, Y., Wildes, F., Pathak, A. P., Kominsky, S. L., Artemov, D., Bhujwalla, Z. M., van Diest, P., Burger, H., Glackin, C. and Raman, V. Twist over-expression induces in vivo angiogenesis and correlates with chromosomal instability in breast cancer. *Cancer Research* 2005; 65:10801-10809.
4. Duriseti, S., Winnard, P. Jr., Mironchik, Y., Vesuna, F., Raman, A. and Raman, V. HOXA5 regulates hMLH1 expression in breast cancer cells. *Neoplasia* 2006; 8:250-258.
5. Henderson, S. G., van Diest, P., Burger, H., Russo, J. and Raman, V. Expression pattern of a homeotic gene, HOXA5, in normal breast and in breast tumors. *Cellular Oncology* 2006; 28:305-313.
6. Gilad, A. A., McMahon, M. T., Walczak, P., Winnard, P. Jr., Raman, V., Bulte, J. M. and van Zijl P. C. Artificial reporter gene providing MRI contrast based on the exchange properties of endogenous amide protons. *Nature Biotechnology* 2007; 25: 217-219.
7. Raman, V., Pathak, A. P., Glunde, K., Artemov, D. and Bhujwalla, Z. M. Magnetic resonance imaging and spectroscopy of transgenic models of cancer. *NMR in Biomedicine* 2007; 20:186-199.
8. Kato, Y., Okollie, B., Raman, V., Vesuna, F., Wildes, F., Zhao, M., Baker, S. D., Bhujwalla, Z. M. and Artemov, D. Contributing factors of temozolomide resistance in MCF-7 tumor xenograft models. *Cancer Biology and Therapy* 2007; 6:891-897.
9. Mori, M., Glunde, K., Takagi, T., Raman, V., and Bhujwalla, ZM. Choline kinase down-regulation increases the effect of 5-fluorouracil in breast cancer cells. *Cancer Research* 2007; 67:11284-90.
10. Gort, H.E., Suijkerbuijk, M. P. K., Roothaan, S., Raman, V., Vooijs, M., van der Wall, E. and van Diest, J. Methylation of the TWIST1 promoter, TWIST1 mRNA levels, and immunohistochemical analysis of TWIST1 in breast cancer. (2008) *Cancer Epidemiology Biomarkers and Prevention* 17:3325-3330. Not supported by NIH funding.

D. Research Support

Ongoing Research Support

2P50CA103175-06A2 (Bhujwalla)

09/22/11-06/30/16

NCI

JHU ICMIC Program

This center grant funds an *In vivo* Cellular and Molecular Imaging Center at Johns Hopkins. The program consists of four research components, four developmental projects, one career development award and four resources.

1R01 CA131250-01A2 (Raman)

09/14/11 – 07/31/16

NIH/NC

The role of Twist in inducing breast cancer initiating cells and metastasis

The goal of this project is functionally determine the role of Twist in promoting breast cancer initiating cells as well as in metastasis.

R01CA073850 (Bhujwalla) 04/01/97-11/30/14
NCI

Functional Imaging of the Metastatic Phenotype

To determine if cancer cell dissemination occurs from hypoxic or normoxic tumor regions in metastasis permissive environments, and investigate the sequence of establishment of hypoxic foci in lymphatic metastatic sites and ascites.

DOD (Raman) 08/01/10-07/31/12
W81XWH-10-1-0603

A novel RNA helicase inhibitor to treat breast cancer

The goals for this project are to study the inhibitor effects of a RNA helicase inhibitor to treat breast cancer.

1R01CA140226 (Raman) 03/10/09-12/31/14
NIH

Functional imaging of TWIST induced breast Cancer

The goal of this project is to image the microenvironment induced by TWIST expression in breast cancer.

1R01 CA134695-01 (Glunde/Heeren) 08/01/08-07/31/13
NIH/NCI

Imaging hypoxia-driven signaling pathways in the breast tumor microenvironment

The aim of this R01 is to decipher novel molecular signaling pathways that are driven by hypoxia in the breast tumor microenvironment using a multimodal molecular imaging approach, which will include *in vivo* magnetic resonance spectroscopic imaging, optical imaging, as well as mass spectrometry imaging.

1R01CA138264-01 (Popel) 02/13/09-12/31/13
NIH-NCI

Predictive experiment-based multiscale models of angiogenesis in breast cancer

The major goal of this project is to develop predictive multiscale models of breast cancer. Mouse model xenografts of human breast cancer will be used; multiscale imaging studies and molecular studies will provide the foundation for models validation.

2R01-ES011863 (Pothireddy) 03/01/09-12/31/13
NIEHS/NIH

The role and biology of FRA-1 in lung injury-repair

The goal of this proposal is to elucidate the mechanisms of regulation of FRA-1 transcription and the role of in acute lung injury using both cell culture and transgenic mouse model

1R01CA136756-01A1 (Bhujwalla) 07/01/09-06/30/14
NIH

Imaging hypoxia and cancer stem cells

The goal of this project is to understand the role of the tumor microenvironment and choline metabolism in harboring or creating stem-like cancer cells.

1R01CA138515-01A1 (Bhujwalla) 07/01/09-06/30/14
NIH

Image-guided prodrug and siRNA targeting of cancer

This purpose of this grant is two-fold – to develop effective treatment strategies utilizing image guided prodrug enzyme-siRNA treatment that will minimize damage to normal tissue and secondly to use these strategies to target metastatic lesions.

Susan Komen (Artemov) 06/30/10-05/31/13

Novel two-component delivery system based on Her-2/neu receptor internalization strategy
The main goal of the project is to develop and validate a novel drug delivery system that utilizes induced internalization of Her-2 receptors.

Completed Projects Within Last Three Years

NCI P50CA103175-05S1 (Bhujwalla) 08/01/03-07/31/11 NCE

JHU ICMIC Program

This center grant funds an in vivo Cellular and Molecular Imaging Center at Johns Hopkins. The program consists of four research components, developmental projects, career development awards and five resources. The competitive renewal of this application received a priority score of 23, and we are currently completing formalities prior to receiving the notice of grant award.

R21 CA2149550-0131 (Resar) 04/01/10-03/31/12

NIH/NCI

HMGA1 in Tumor Progression in Breast Cancer

The major goals of this project are to determine if HMGA1 is a marker for more advanced breast cancer and to identify downstream transcriptional targets of HMGA1 in breast cells transduced to overexpress HMGA1 or breast cancer cells with knock-down of HMGA1.

TEDCO-Maryland (Raman) 09/01/09-08/31/11

Maryland Stem Cell Research Fund

Characterizing the Role of Twist in the Development of Breast Cancer Stem Cells

The major goals of this project are to identify Twist induced pathways that promote the development of breast cancer stem cells.

1RO1 CA097226 (Raman) 03/15/04-02/28/10

NIH/NCI No-cost extension

The role of HOXA5 in breast cancer

This application is to evaluate the multiple functions of HOXA5 during normal breast development and in breast tumorigenesis.

FAMRI (Raman) 06/01/06-05/31/09

Activation of DDX3 by benzo[a]pyrene diol epoxide, a component of secondhand tobacco smoke, in human breast cells: a potential mechanism for neoplastic transformation.

The major goals of this project are to study the functional role of DDX3 in breast cancer biogenesis.