

## BIOGRAPHICAL SKETCH

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NAME LABHASETWAR, Vinod	POSITION TITLE Professor and Director Cancer Nanomedicine Program		
eRA COMMONS USER NAME LABHASETWAR.VINOD			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Dept. Pharmaceutical Sciences, India	B. Pharm	1982	Pharmacy
Dept. Pharmaceutical Sciences, India	M. Pharm	1984	Pharmaceutics
Dept. Pharmaceutical Sciences, India	Ph.D.	1990	Pharmaceutics
University of Michigan, Ann Arbor, MI	Post-doc	1990-93	Drug and Gene Delivery

**A. Personal Statement:** My laboratory's research focus is on translational nanomedicine, which involves biomaterials synthesis, formulation design and development, and evaluation of different biocompatible nanoparticle-based platform technologies for targeted drug, protein, and gene delivery and imaging agents. Our current research interests are in **a)** cancer treatment particularly metastatic disease and its detection, **b)** delivery of antioxidant enzymes in stroke, traumatic brain injury (TBI), spinal cord injury to facilitate neuronal repair mechanism and recovery, and **c)** developing a nonstent approach to inhibition of restenosis following angioplasty. In addition, we investigate the biophysics of nanoparticle-lipid interactions to understand how they influence cellular uptake and intracellular trafficking of NPs, *in vivo* biodistribution, and target localization. We use optical and magnetic resonance imaging to study biodistribution and targeting of nanoparticles. My laboratory has extensive experience in all aspects of nanoparticle fabrication, including delivery of DNA for gene therapy.

### B. Positions and Honors

#### Positions and Employment

1988-90	Staff Scientist, National Institute of Immunology, New Delhi, India
1993-97	Assist. Research Professor, University of Michigan Medical School, Ann Arbor, MI
1997-2007	Associate Professor, Dept. of Pharmaceutical Sciences and Dept. of Biochemistry and Molecular Biology, University of Nebraska Medical Center, Omaha, NE
2001-07	Associate Professor (courtesy), Department of Biological Systems Engineering, College of Engineering and Technology, University of Lincoln, Lincoln, NE
2007-pres.	Professor, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University; Staff, Dept. of Biomedical Engineering and Taussig Cancer Institute, Cleveland Clinic, Cleveland, OH
2008-09	Adjunct Professor, Dept. of Pharmaceutical Sciences, University of Nebraska Medical Center, Omaha, NE
2008-pres.	Director, NanoMedicine Program, Lerner Research Institute, Cleveland Clinic
2008-pres.	Adjunct Professor, Dept. of Chemical and Biomedical Engineering, Cleveland State University, Cleveland, OH;
2009-pres.	Adjunct Professor, Dept. of Biomedical Engineering, Case Western Reserve University, Cleveland, OH
2011-pres.	Adjunct Professor, Integrated Bioscience, University of Akron, Akron and Director of the collaborative Graduate Program between University of Akron and Lerner Research Institute

#### Honors & Awards

1989	Best Research Award, National Institute of Immunology, New Delhi Dipstick DOT-EIA for the Diagnosis of Typhoid
1996	Outstanding Young Clinical Investigator, Dept. of Pediatrics, University of Michigan Nanoparticles- A Novel Nonviral Method of Gene Transfer
1996,97,98	Technology Award, University of Michigan for Patents and Technology Transfer
2005-2008	Editor-in-Chief, <i>Journal of Biomedical Nanotechnology</i> (American Scientific Publishers, Valencia, CA).
2006	Distinguished Scientist, University of Nebraska Medical Center

- 2007 Innovator Award, University of Nebraska Medical Center  
 2008 Fellow of the American Association of Pharmaceutical Scientists  
 2009 Guest Editor, Special Issue on nanotechnology for therapy, imaging, and diagnosis, *Molecular Pharmaceutics*, Vol. 6, Issue 5, 2009 (American Chemical Society, ACS Publications)  
 2010-pres. Editor-in-Chief, *Drug Delivery and Translational Research* (An Official Journal of the Controlled Release Society, published by Springer)  
 2011 Top 5% most cited author in the field of Pharmacology; Authors of a top 1% most cited paper in the field of Pharmacology and Pharmacy

#### **Other Experience and Professional Memberships**

- 2008 Organizer, Nanomedicine Summit, Cleveland, OH  
 2010 Organizer, Nanomedicine Summit, Cleveland, OH  
 2011-14 NIH: Regular Member, NANO Study Section  
 2011 Organizer, Indo-US Joint Symposium, Nanomedicine: Prospects and Challenges, Mumbai, India

#### **C. Selected Peer-reviewed Publications (from a total of over 135)**

1. Panyam J, Zhou WZ, Prabha S, Sahoo S, Labhasetwar V. Rapid endo-lysosomal escape of poly (D, L-lactide-co-glycolide) nanoparticles: implication for drug and gene delivery. *FASEB J.* 16,1217-1226, 2002.
2. Prabha S, Zhou WZ, Panyam J, Labhasetwar V. Size-dependency of nanoparticle-mediated gene transfection: Studies with fractionated nanoparticles. *Int. J. Pharm.* 244,105-115, 2002.
3. Davda J, Labhasetwar V. Sustained activity of vascular endothelial growth factor following encapsulation in nanoparticles. *J. Biomed. Nanotechnology.* 1,74-82, 2005.
4. Prabha S, Labhasetwar V. Nanoparticle-mediated *wt*-p53 gene delivery results in sustained antiproliferative activity in breast cancer cells, *Mol. Pharmaceutics* 1(3), 211-219, 2004.
5. Peetla C, Labhasetwar V. Biophysical characterization of nanoparticle-endothelial model cell membrane interactions, *Mol. Pharmaceutics* 5, 418 - 429, 2008.
6. Vasir JK, Labhasetwar V. Quantification of the force of nanoparticle-cell membrane interactions and its influence on intracellular trafficking of nanoparticles, *Biomaterials*, 29, 4244-52, 2008.
7. Rao KS, Reddy MK, Horning JL, Labhasetwar V. TAT-conjugated nanoparticles for the CNS delivery of anti-HIV drugs. *Biomaterials*, 29, 4429-4438, 2008.
8. Reddy MK, Vasir JK, Sahoo SK, Jain TK, Yallapu MM, Labhasetwar V. Inhibition of apoptosis through localized delivery of rapamycin-loaded nanoparticles prevented neointimal hyperplasia and re-endothelialized injured artery. *Circ. Cardiovasc. Intervent.* 1, 209-216, 2008.
9. Peetla C, Labhasetwar V. Effect of molecular structure of cationic surfactants on biophysical interactions of the surfactant-modified nanoparticles with a model membrane and cellular uptake, *Langmuir*, 25 (4), 2369–2377, 2009.
10. Peetla C, Rao KS, Labhasetwar V. Relevance of biophysical interactions of nanoparticles with a model membrane in predicting cellular uptake: study with TAT peptide-conjugated nanoparticles, *Mol. Pharmaceutics*, 6, 1311–1320, 2009.
11. Peetla C, Stine A, Labhasetwar V. Labhasetwar V. Biophysical interactions with model lipid membranes: applications in drug discovery and drug delivery. *Mol. Pharmaceutics*, 6, 1264–1276, 2009.
12. Reddy MK, Labhasetwar V. Nanoparticle-mediated delivery of superoxide dismutase to the brain: an effective strategy to reduce ischemia-reperfusion injury. *FASEB J*, 23(5):1384-95,2009.
13. Peetla C, Bhawe R, Vijayaraghavalu S, Stine A, Kooijman E, Labhasetwar V. Drug resistance in breast cancer cells: Biophysical characterization of and doxorubicin interactions with membrane lipids. *Mol. Pharmaceutics* 7(6):2334-48, 2010.
14. Foy S, Manthe R, Foy S, Dimitrijevic S, Krishnamurthy N, Labhasetwar V. Optical imaging and magnetic field targeting of magnetic nanoparticles in tumors, *ACS Nano*, 4(9):5217-24, 2010.
15. Sharma B, Ma W, Adjei A, Panyam J, Dimitrijevic D, Labhasetwar V. Nanoparticle-mediated p53 gene therapy for tumor inhibition. *Drug Del. Trans. Res.* 1(1): 43-52, 2011.

#### **D. Research Support**

##### **Ongoing Research Support**

1R01NS070896-01

PI: Labhasetwar V

08/15/2010- 05/31/2015

NIH/NINDS

**Stroke Therapy**

The purpose is to evaluate the efficacy of nano-SOD/catalase for the CNS delivery in stroke condition. The hypothesis is that nano-SOD/catalase with its sustained neuroprotective effects would reduced reperfusion injury following stroke and create conditions favorable for neuronal repair to regain neurologic functions.

Role: PI

1R01CA149359-01

PI: Labhassetwar, V.

05/10/2010 – 03/31/2015

NCI/NIH

### **Drug resistance in cancer therapy**

The purpose is to modulate the membrane properties of drug resistant cells with epigenetic drugs to facilitate the transport of drug/nanoparticles to overcome drug resistance in cancer therapy. The study involves demonstrating the efficacy of the therapy in drug-resistant (MCF-7/Adr)-cell induced orthotopic breast tumor model.

Role: PI

R01 NS048837

PI: Ghorpade, A.

02/01/2009 – 01/31/2014

NIH/NINDS

### **Neuronal Survival, HIV-1 and Astrocyte-TIMP-1**

This proposal is a competing renewal that addresses key issues regarding regulation of Tissue Inhibitor of Metalloproteinase-1 in HIV-1-associated dementia and in other inflammatory diseases. Investigations will include the specific mechanisms involved in the regulation of TIMP-1 at the promoter level, the role of CD63 as a potential receptor for TIMP-1 neuroprotection.

Role: Co-PI

PR081404

PIs: Sauntharajah, Y and Labhassetwar V. 06/01/2009 – 05/31/2013

Dept. of Defense Peer Reviewed Medical Program

### **Next generation DNMT1 depletion therapy for leukemia**

Project goals are to develop novel regimens and formulations of decitabine for non-DNA damaging DNMT1 depletion therapy. There are two specific aims: (1) To utilize the SGM3/NOG pre-clinical model of invasive human leukemia to optimize decitabine/THU as a chronic oral therapy that differentially eradicates leukemia stem-cells but not normal hematopoietic stem-cells, and (2) To develop a single compound that surmounts multiple mechanisms of malignant stem cell resistance to DNMT1 depletion by decitabine.

Role: Co-PI

R21 HL093689

PI: Meininger, C.

05/01/2009 – 06/30/2012 (no cost extension)

National Institutes of Health

### **Treating Endothelial Cell Dysfunction with Targeted Nanoparticle-based BH Delivery**

The central goal is to develop novel nonviral delivery “vehicles” to carry BH4 into specific endothelial cells in blood vessels in order to reverse the detrimental vascular effects of diabetes.

Role: Co-investigator

Industrial funding

PI: Labhassetwar, V.

06/01/2007 – 11/30/2013

Telomolecular, Inc., Rancho Cordova, CA

### **Nanoparticle-based protein delivery**

The purpose of this grant is to develop nanoparticle-based delivery for protein therapeutics. There are two specific aims: (1) to develop nanoparticles for protein delivery and (2) to evaluate their efficacy in age related diseases.

Role: PI

### **Completed Research Support**

1R01 EB 003975-01A1

PI: Labhassetwar, V.

09/01/2005 – 06/30/2011 (no-cost extension)

NIBIB/NIH

### **Nuclear-targeted nanoparticles for gene delivery**

The purpose of this grant is to investigate intracellular trafficking of nanoparticles, evaluate nanoparticles for gene transfection in vitro, and for tumor inhibition in prostate tumor model.

Role: PI

1R01 EB005822-01

PI: Labhasetwar, V.

03/01/2006 – 12/31/2009

NIBIB/NIH

**Biomagnetic nanoparticles for drug delivery and imaging**

The purpose is to determine magnetic nanoparticles of different composition for imaging using MRI for early detection of tumors and targeted drug therapy in response to an external magnetic field in cancer treatment.

Role: PI

1R21 CA121751-01

PI: Labhasetwar, V.

04/01/2006 – 03/30/2009

NCI/NIH

**Drug resistance in cancer therapy**

The purpose is to determine the efficacy of modified nanoparticles to overcome drug resistance in cancer therapy.

Role: PI