# DRUG DISCOVERY AND NANOMEDICINE RESEARCH PROGRAM
## AT JOHN WAYNE CANCER INSTITUTE & PACIFIC NEUROSCIENCE INSTITUTE

The Drug Discovery and Nanomedicine (DDNM) Research Program at JWCI fosters the development of novel, safe and cost-effective therapeutics for both oncology and central nervous system targets.

Our laboratory, under the Department of Translational Neurosciences and Neurotherapeutics, is focused on druggable targets which have already been validated in the clinic or in clinical trials. We work closely with scientists and clinicians from diverse backgrounds to develop novel therapeutic agents for unmet clinical challenges.
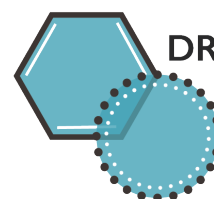


**DRUG DISCOVERY + NANOMEDICINE**

Creating the next generation of novel cost-effective therapeutics including drugs & drug formulations for the future of Precision Medicine

## GOALS AND OBJECTIVES

Our lab is unique in that, rather than practicing the slow, costly and labor-intensive traditional blockbuster drug development model, we center our work on four fast and cost-effective research areas, depending on the demands of the project:

1. **Precision Medicine Drug Discovery** in which we match the right patient to the right drug, because every disease is different with its own ever-changing unique genomic profile.

2. **Drug Repurposing** in which we reuse existing licensed drugs for new medical indications. We especially apply this method for rare diseases where there are no existing treatment options.

3. **Combination Studies** in which we take a multi-pronged approach to cancer treatment. We aim to combine immunotherapy and standard-of-care therapy (chemo and radiation), with our lead investigational drugs to increase the overall treatment efficiency and improve patient outcomes

4. **Nano Drug Formulation** in which we develop lipid and lipid polymer hybrid nano-carriers to encapsulate investigational and approved drugs. Our goal is to improve the therapeutic index of the drugs by reducing off-target toxicity, and improving the drug exposure at the primary and metastatic tumor site to overcome disease recurrence.

## COLLABORATIONS

The DDNM research program is constantly seeking new opportunities to collaborate. We welcome informal discussions within the institute and outside on translational research ideas, and the development of novel therapeutics for researchers' projects. When discussing a new collaborative project, we consider several factors including druggability, the clinical importance of disease targets, innovation, the novelty of the research project, and compatibility with our expertise and capabilities. If you would like to initiate discussions with our team, please contact us at **VMY@JWCI.ORG.**

# DDNM PROGRAM

Our DDNM research program allies with top level academic institutions and custom research organization companies to bring our ideas to fruition. Listed below are some of the major activities of DDNM research in collaboration with academia, pharma and biotech companies.

## VIRTUAL SCREENING

We utilize modern computationally-aided drug design methods to identify diversified chemical scaffolds for new clinically validated and druggable protein targets of interest, prior to labor-intensive wet-lab validation. Our DDNM program is collaborating with computational scientists at Molsoft LLC (San Diego, CA), The University of Tennessee (Knoxville, TN), and UCI (Irvine, CA) to execute our computational drug design projects.

## MEDICINAL CHEMISTRY AND STRUCTURE-ACTIVITY RELATIONSHIP (SAR)

In order to speed up the SAR process for developing novel patentable drug like leads, the DDNM research program has collaborated with both academia and pharma custom research organization companies to synthesize a number of diversified chemical scaffolds for lead optimization.

## DRUG TARGET ENGAGEMENT STUDIES FOR PRECISION MEDICINE

We advance the discovery of effective drugs and combination therapies through our in-depth understanding of the biology of disease, and by developing drugs towards individualized precision medicine. We have the support of a multidisciplinary array of translational scientists and bioinformaticians advising us on precision medicine oriented cellular and molecular biology techniques.

## DRUG METABOLISM, PHARMACOKINETICS AND EFFICACY STUDIES

In the process of identifying drug-like small molecules, pharmacokinetic (PK) and pharmacodynamic (PD) studies are key experiments to understand the drug's safety and efficacy profile. We will perform these studies in collaboration with various pharma CRO companies.

## NANO DRUG FORMULATIONS

We are currently developing novel lipid and lipid polymer hybrid drug formulations for improving the therapeutic index of investigational as well as clinically active drugs.



# CURRENT RESEARCH FOCUS
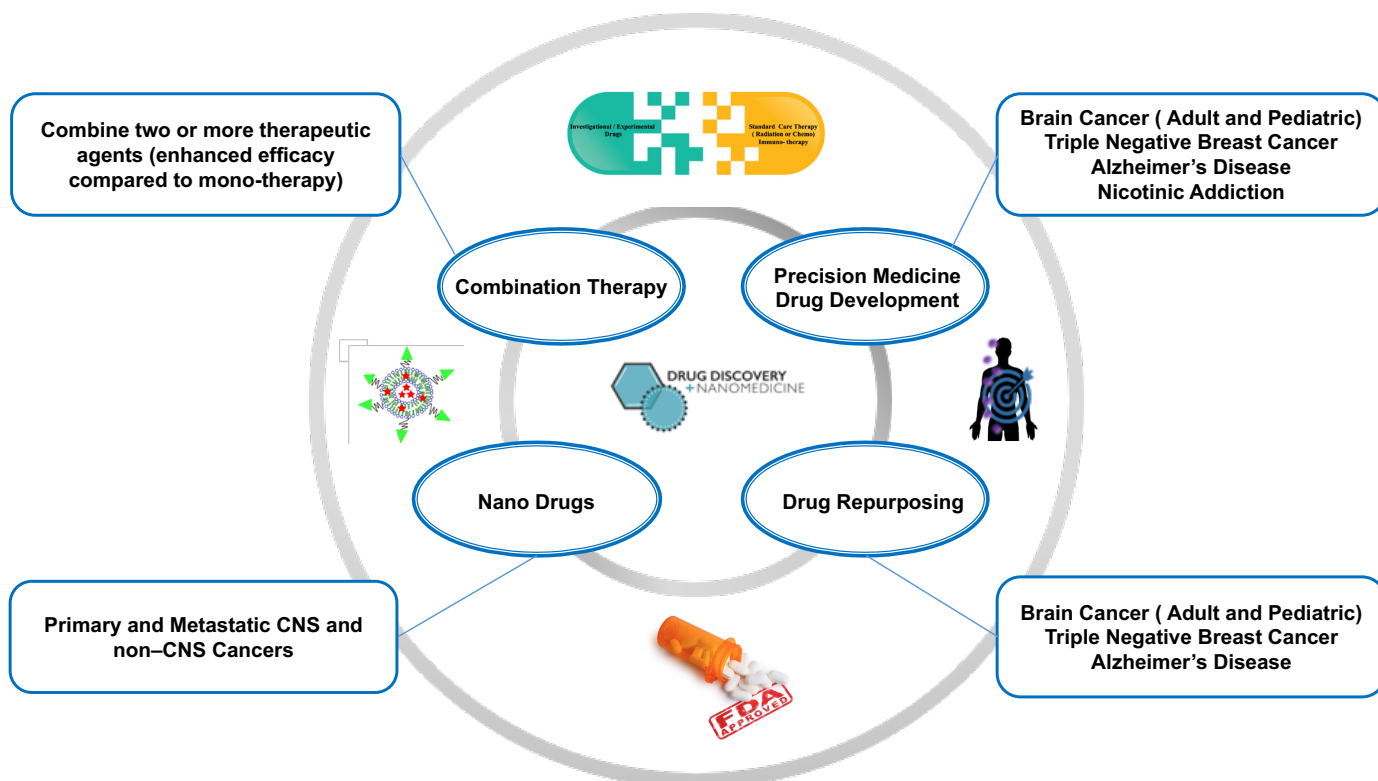
## SUPPORTING TEAMS

The JWCI research environment is a perfect fit for translational research in the sense that we have multidisciplinary array of translational scientists, clinicians and bioinformaticians under one roof working to address clinical problems. Moreover, we have strong support from the Department of Translational Neurosciences and Neurotherapeutics research team in helping on some of the drug discovery biology projects.

## RESEARCH TEAM

Ariana Waters, Research Associate

Yueqin Quan, Research Associate

Annamarie B. Allnutt, Research Associate

## COLLABORATING TEAMS

## TRANSLATIONAL RESEARCH

## INTERNAL

Santosh Kesari, MD, PhD

Elmar Nurmemmedov, PhD, MBA

Alexandre Wojcinski, PhD

Diego Marzese, PhD

Chikako Matsuba, PhD

## EXTERNAL

Rintaro Hashizume, MD, PhD, Northwestern University

Chris Albanese, PhD, Georgetown University

David Mobley, PhD, UC Irvine

Sandeep Burma, PhD, San Antonio Health Center

Kenneth J. Kellar, PhD, Georgetown University

Manzoor Koyakutty, PhD, AIMS, Cochin, India

Several Biotech CRO's within and outside USA

## CLINICAL RESEARCH

Santosh Kesari, MD, PhD - Brain Cancer

Rintaro Hashizume, MD, PhD - Pediatric Brain Cancer

Janie G. Grumley, MD - Breast Cancer

Przemyslaw W. Twardowski, MD - Prostate Cancer

Aiwu Ruth He, MD, PhD - Liver Cancer

## SCIENTIFIC WRITING TEAM

Ian V. Hutchinson, PhD, DSc
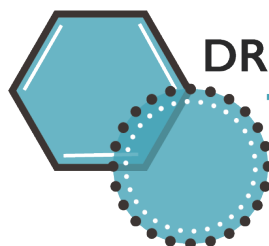
Tiffany Juarez, PhD

## ADDITIONAL SUPPORT

Natsuko Nomura, BS

Zara Jethani, MS, MBA

Fariba Ahdoot, MA

## VISION

With the support of JWCI, PNI and Saint John Foundation, we hope to translate our laboratory-based research into truly personalized treatment for cancer and neurodegenerative disease patients.

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## ABOUT THE PRINCIPAL INVESTIGATOR

### VENKATA MAHIDHAR YENUGONDA, MPhil, PhD

Director, Drug Discovery and Nanomedicine Research Program;
Assistant Faculty Member, Providence Health and Services;
Associate Professor, Translational Neurosciences and Neurotherapeutics,
John Wayne Cancer Institute

Dr. Venkata Yenugonda is a member of the Research Faculty and Director of the Drug Discovery and Nanomedicine Research Program at JWCI. He has significant background in both Medicinal Chemistry and lipid-based nanoparticle research, for the development of oncology and neuroscience therapeutics. He has also spent much of his career working on lead optimization (structure-activity relationship) projects using modern molecular and cellular biology techniques, in which he has identified leads for preclinical IND enabling studies.

Over the year's Dr Yenugonda's experience has included the development of cost effective small molecule therapeutics in a wide range of disease areas including cancer, neurodegenerative diseases, neurological disorders, immune modulation, anti-cholesterol agents and rheumatology. Through these projects he has identified several drug-like leads, which are currently at various stages of drug development process. Many of Dr Yenugonda's papers include collaborations with multiple investigators from diverse backgrounds at a variety of institutions, demonstrating an ability to work in productive joint projects. He is the co-inventor of several US patents and provisional patent applications. He is a member of National Academy of Inventors, and a scientific advisor for several biotech startup companies.

Dr Yenugonda believes in using an in-depth understanding of the biology of disease and applying precision medicine drug development approaches to advance the discovery of effective drugs and combination therapies. His laboratory is unique in that, rather than practicing the slow, costly, and labor-intensive traditional blockbuster drug development model, it concentrates on four fast and cost-effective research approaches: 1. Precision drug discovery, 2. Drug repurposing 3. Nanodrugs and 4. Combination Therapy. Dr. Yenugonda's unique perspective and experience in the fields of Drug Discovery and Nanomedicine will help advance ongoing translational cancer drug discovery projects at the John Wayne Cancer Institute. Additionally, he will collaborate with Pacific Neuroscience Institute's medical specialists to implement novel therapeutic strategies for central nervous system diseases and disorders.

For more information contact us at:
**310-582-7489 | vmy@jwci.org**