HC, PHHS, PHARMACY FACULTY RESEARCH SHOWCASE
Reduced Lymph Node invasion after targeted drug delivery

Leung et al., Journal of Clinical Investigation, 2004

From Eczema to Melanoma

Dial @ 75775 Arup.indra@oregonstate.edu

Identify Cause

Eczema: itch

Cure disease

Ctip2<sup>−/−</sup>

Bioactive synthetic compounds kill human melanoma cells

XN

Reduced Lymph Node invasion after targeted drug delivery

Vehicle

Aminocyclopentitols

Alani and Indra

Drug

Cure disease

Malignant skin cancer treatment

Slominski & Indra

NIAMS

NIEHS

NIH| DOD

Lipidomics by UPLC-TOF-MS

Stevens and Indra

Leung et al. Journal of Clinical Investigation, 2004

Eczema

Melanoma
Research Projects

1. Eczema: Most common inflammatory skin disease, affects >30 million people/year. Patients develop asthma and allergic rhinitis-atopic march. (Prevention, therapeutic intervention)
   - MOA and gene-environment interactions
   - Lipidomics for genotype-phenotype correlation (treatment outcome, disease severity), susceptibility to S. aureus infections

2. Melanoma: Deadliest skin cancer. High incidence, low survival rate for metastatic melanoma. Frequent resistance to targeted therapy, immunotherapy following surgical resection (Early detection, prevention, therapeutic intervention).
   - Identification of candidate driver and tumor modifiers: biomarkers
   - Evaluation of tumor heterogeneity and microenvironmental effects
   - Generating unique models for gene-environment (UV) interactions

3. Cell—cell communications via extracellular vesicles (detection, delivery, MOA, therapeutic interventions)

4. Characterization of bioactive compounds and metabolites for cancer prevention and treatment
MARIE HARVEY
RESEARCH OPPORTUNITIES

Marie Harvey, DrPH, MPH
Associate Dean for Research
Distinguished Professor
Advancing science, making discoveries, and engaging communities to promote lifelong health and well-being

Develop a holistic understanding of the health of individuals and populations AND

Create feasible approaches to solving current and emerging public health and societal problems
We **study**: 

- individuals across the life course, 
- focus on health equity and addressing health disparities, and 
- conduct both basic and applied research, including the translation of public health programs to real-world settings
Five Signature Research Areas that span the expertise and disciplines of the faculty in our College

OREGON STATE UNIVERSITY | COLLEGE OF PUBLIC HEALTH AND HUMAN SCIENCES
Optimal health through nutrition and physical activity

- dietary influences on cancer prevention
- bone metabolism and health
- motor skill development in young children
- obesity-related disorders
- food security
- neuromechanics
Prevention of chronic diseases and promotion of healthy behaviors

- Promoting the adoption of healthy behaviors
- Preventing chronic diseases: cardiovascular disease; cancers; and obesity
- Reducing the use of new and emerging tobacco products
- Promoting sexual and reproductive health
Healthy developmental processes and transitions across the lifespan

- optimal childhood development
- school readiness
- caregiving
- optimal aging
Health systems reform and health policy

- impact of health reforms on the health of Oregonians
- health care access and utilization
- measuring and improving the quality of health care
- global health systems and governance
Environmental and occupational hazards and human health

- health impacts of exposure to air and water pollution and other chemicals in our environment
- the built environment, urban green space
- climate change
- occupational exposures to health and safety hazards
College Research Centers

• Center for Global Health
  • Director: Chunhuei Chi, ScD, MPH

• Center for Healthy Aging Research
  • Co-Directors: Karen Hooker, PhD, and Emily Ho, PhD

• Hallie E. Ford Center for Healthy Children and Families
  • Director: Megan McClelland, PhD

• The Moore Family Center for Whole Grain Foods, Nutrition, and Preventive Health
  • Director: Siew Sun Wong, PhD
Please contact us. We’d love to work with undergraduate students!

**S. Marie Harvey**
- OSU Distinguished Professor & Associate Dean for Research
- 124 Women’s Building
- 541-737-3824
- Marie.Harvey@oregonstate.edu

**Susan Emerson**
- Research Program Coordinator
- 123 Women’s Building
- 541-737-2689
- Susan.Emerson@oregonstate.edu
Marie Harvey – Risky sexual behavior and access to health services
Marie.harvey@oregonstate.edu

Denise Hynes – Improving health care quality, access and costs for veterans and other populations
Hynesd@oregonstate.edu

Tao Li – Health disparities for low-income individuals; patient-centered medical home; health care financing and quality
Tao.Li2@oregonstate.edu

Selected Current Funded Research

- Systems Approach to Perinatal Opioid Exposure and Maternal Suicidality
- Opening the Conversation for Couples with Reproductive Health Concerns
- Care Coordination and Outcomes for High Risk Patients
- Community Care Utilization among Post 9-11 Veterans with Traumatic Brain Injury
- Care Coordination Services for People with Mental Health Conditions
- Cost Effectiveness of Athletic Training Services
Health Management & Policy

Jeff Luck – Performance of health care delivery systems; measuring and improving quality of care; long-term care
Jeff.luck@oregonstate.edu

Carolyn Mendez-Luck – Long-term care policy, family caregiving and aging-related health disparities
Carolyn.mendez-luck@oregonstate.edu

Allison Myers – Developing and implementing policy, systems, and environmental approaches to promote public health and health equity
Allison.myers@oregonstate.edu

Selected Current Research Projects

• Oregon Nursing Facilities Project
• Public Reporting of Quality Measures in Community-Based Long-Term Care Settings
• Robert Wood Johnson Health Policy Fellowship
• State Plan for Alzheimer’s Disease in Oregon
• ASPIRE Children’s Environmental Health Research Translation Center
• Linn Wellness in Neighborhood Stores (WINS)
• Coast to Forest – Mental Health Promotion and Substance Use Prevention
Investigating gut health-promoting activities of biologically active molecules from human milk in term and preterm infants

- Examining how milk proteins are digested in term/preterm infants using mass spectrometry
- Examining the effects of processing on donor milk quality
- Studying milk peptides antibacterial and anti-inflammatory properties

Collaborations with US and international dairy companies

- Studying how bioactive bovine milk proteins are digested in adults and how they affect gut health
- Identifying peptide and proteases contributors to cheese bitterness
- Studying infant formula glycopeptides and glycoproteins

Milk Bioactive Research Lab: PI Dave Dallas

dave.dallas@oregonstate.edu
http://www.dallaslab.org/
Fred Stevens, PharmD, PhD
fred.stevens@oregonstate.edu

Professor of Pharmaceutical Sciences
Associate Dean for Research, College of Pharmacy
Principal Investigator, Linus Pauling Institute
Guest Professor, University of Antwerp, Belgium

**Research focus:** Natural products and vitamins for improving human health and preventing/treating metabolic diseases. Tools: natural products/medicinal chemistry, mass spectrometry, metabolomics, cell culture, animal models, human studies

**Classes taught:** PHAR 714 (Complementary medicine), PHAR 753/754 (Integrated Drug Structure, Action and Therapeutics II/II), PHAR 537 (Natural Products Biosynthesis), VMB 671 (Molecular Tools/Metabolomics)

**Mentoring experience:** >80 undergraduate and graduate students, foreign exchange students and visiting scholars (12 countries), postdocs, and research professors
Research Opportunities in the College of Pharmacy

Pharmaceutical Sciences
- Gene Regulation and Disease
- Targeted Drug Delivery
- Pharmacokinetics and Pharmacodynamics
- Cardiovascular & Metabolic Disease
- Infectious Disease
  - Drug Discovery
  - Pharmacotherapy

Pharmacy Practice
- Pharmacy Outcomes Research
- Epidemiology Public Health
  - Ambulatory Care
Center for Innovative Drug Delivery and Imaging (CIDDI)

disease-specific delivery of therapeutics and imaging agents

https://www.ciddiosu.org/

- Targeted Nanoparticles:
  - Tissue specific
  - Antibodies
  - Peptides
  - Proteins
  - Specific delivery of drugs or contrast agents
  - Reduced toxicity

- Theranostic Nanoparticles
  - Combined therapy and diagnostic capabilities
    - Visualize abnormal tissue and drug delivery
    - Monitor therapeutic response

Delivery Platforms:
- Polymeric Nanoparticles
- Lipid Nanoparticles (LNPs)
- Liposomes, micelles

Cargos:
- siRNA, mRNA
- Small drug molecules
- Imaging agents
- Inorganic nanomaterials

Delivery routes:
- IV, IP, IM, SQ, oral, transdermal

Treatment/Imaging modality:
- mRNA therapeutics
- Magnetic hyperthermia
- Chemotherapy
- Gene therapy
- Image-guided therapy
- Fluorescence imaging
- Photoacoustic imaging
- Photodynamic therapy

Sun, C., Lee, J., and Zhang, M., Advanced Drug Delivery Reviews, 2008 60(11): 1252-1265

Honors College Mixer, April 18, 2022
Nano-Theranostics: Imaging and Treatment

- Improves tissue targeting
- Reduces toxicity
- Visualizes specific tissue and accompanies drug delivery
- Monitors therapeutic outcomes
- Theranostic: image-guided therapy

Olena Taratula, PhD
olena.taratula@oregonstate.edu
Associate Professor (Sr. Res.) of Pharmaceutical Sciences
OSU College of Pharmacy

Honors College Mixer, April 18, 2022
Kevin Brown – Complex Systems
Pharmaceutical Sciences and CBEE
kevin.brown@oregonstate.edu

- Mathematical modeling of biochemical networks
- Network structure/function relationships
- Computational bioactive natural product discovery/dereplication
- Dynamics of Spoken Word Recognition
- The mental lexicon
- Multi-omics data integration

Systems Biology

Informatics/Machine Learning

Mental Lexicon

Cognitive Processing