College of Pharmacy
Genome to Drug Discovery Group

Drug Discovery

Drug Delivery

Drug Target Analysis

Chemistry + Biology + Genetics = Advancing Human Health
The Bacterial Extracellular Proteome as Potential Therapeutic Target

Aleksandra Sikora
What makes *Chlamydia*...*Chlamydia*?

\[ Chlamydia \textit{trachomatis}- \text{infected cells} \]

- Vacuole
- Bacteria
- Host nucleus

Dan Rockey
Skin Wound Healing

Healing of Chronic, diabetic, burn wounds is a major health concern.

Head and neck cancer

Cancer is a wound that does not heal.

Diagnosis & Prevention
1. Patented Biomarker (Collaborator: A. Indra & M. Leid)
2. New anticancer drugs (Collaborator: T. Mahmud)

Identify gene targets

Validating targets

Patient’s biopsies & cancer cell lines

New Drug Targets
Taifo Mahmud Laboratory

Drug Discovery and Development

Biosynthetic engineering

Natural product discovery

Chemical synthesis

Infectious diseases and cancers

Genome mining and metabolomics
OSU Natural Products as Probes to study Autophagy and Cell Death in cancer cells

Jane Ishmael
Pharmacology

Mandelalide A
discovered by
Kerry McPhail
in South Africa

Coibamide A
discovered by
Kerry McPhail
in Panama

Coibamide A induces autophagy "self eating" in glioblastoma cells as a survival response

...but the cell still dies
Molecular Cancer Therapeutics

A new generation of drugs designed to interfere with a specific molecular target

Our Focus:

I. Dioxin Receptor from a mediator of toxic responses to an Anti-Cancer Target

II. Conversion of Bcl-2 from a Protector to a Killer Protein

New Molecular Targets For Breast Cancer
Novel inhibitors of the Receptor-tyrosine-kinase-like Orphan Receptor 2 (ROR2) enzyme for cancer treatment

**GENERAL RESEARCH FUND AWARD - URISC UNDERGRAD AWARD**

**Significance**

Successful data drive publications and NHI grant submissions

**Innovation**

Interdisciplinarity

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Andrey Morgun
Assistant Professor
College of Pharmacy

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Drivers of cervical cancer

GERM FREE animals

Trans-kingdom network

microbiome
Host transcriptome
To identify the cell signals that regulate cell differentiation through gene activation.

To understand how enzymatic modifications of transcription factors change gene activation in development and disease.

To reveal new drug targets that regulate gene activation in disease.
Pharmacy Practice Research

• What is pharmacy practice research?
  • Examines how and why people access pharmacy services, the associated costs, and resulting patient outcomes

• My areas of interest include:
  • Impact of clinical pharmacy services on quality metrics and patient outcomes
  • Primary care
  • Dynamics of federally qualified health centers (FQHC)

Adriane Irwin
Nano-therapy for cancer treatment

- Drug solubilization
- Controlled release
- Drug targeting
- Combinatorial drug therapy
  - Ease of administration
  - Synergy/additive drug effects
- Imaging
- Radiotherapy

Adam Alani
Multifunctional Nanomedicine Platforms for Cancer Treatment

Chemotherapy

Hyperthermia

Photodynamic Therapy

Gene Therapy

Theranostic: Photodynamic Therapy and Image-Guided Drug Delivery

Phthalocyanine

Photodynamic Therapy

Image-Guided Drug Delivery

Oleh Taratula