

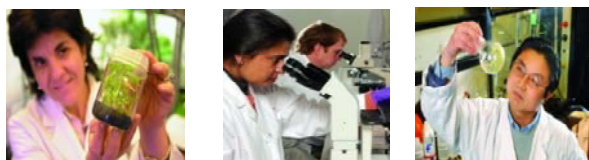
## Introduction

The Research Institute of Pharmaceutical Sciences (RIPS), within the School of Pharmacy, was established in 1964 to discover and disseminate knowledge of natural drug products, develop and commercialize new products, improve public health and stimulate the economy. The major research component of RIPS is the National Center for Natural Products Research (NCNPR). The NCNPR is located in the Thad Cochran Research Center and is the nation's only university-affiliated research center devoted to discovering, developing and commercializing new pharmaceuticals and agrochemicals derived from natural products. The center has a strong focus on botanical research and has a cooperative agreement with the U.S. Food and Drug Administration to conduct research on the quality and safety of botanical dietary supplements.

## Facilities and Resources

Centralized resources include:

- A repository of samples including extracts and column fractions from plants, marine organisms and micro-organisms as well as purified compound (natural, synthetic and semisynthetic).
- Isolation, purification and screening laboratories including Biosafety Level 2 laboratories.
- 600, 500, and 400 MHz NMR spectrometers; LC, GC, MS and CE instrumentation.
- Culture facilities for plant tissue culture and microbial fermentation/isolation.
- Genomics research laboratories.
- Production greenhouses, demonstration garden beds, shade houses, and field plots.



## R&D Focus and Collaborative Opportunities

Botanical research at the NCNPR is aimed at identifying botanical products with the potential to improve human health and at conducting applied research that will enhance the safe and proper use of botanical products by healthcare professionals and consumers.

Research projects focus on enhancing product quality and safety through botanical, pharmacological, chemical and agronomic characterization of botanical products, and the discovery of new botanical products.

## Development Capabilities

Scientists in the Medicinal Plant Research Program at the NCNPR have the capability to study the influence of source, growth, harvest, and processing of medicinal plants on their chemical make-up, as well as their safety and efficacy. In addition, medicinal plants can be studied to improve production of important natural product drugs and as potential alternative crops for U.S. farmers. The NCNPR maintains numerous Collection, Material Transfer and other Intellectual Property Agreements with domestic and international academic institutions and governments enabling the sourcing of a diverse array of plant materials and reference standards.



Development capabilities at the NCNPR include:

- Isolation and structural characterization of bioactive constituents from medicinal plants
- Optimization of large scale extraction processes
- Analytical methods for detecting bioactive constituents, degradation products and contaminants
- Standardization of botanical dietary supplements
- Plant tissue culture and medicinal plant domestication
- Certification of authenticity of seeds and plant specimens
- Crop improvement studies and optimal genotype selection for enhanced yield
- Bioassays and animal models with emphasis on immunomodulation and inflammation

## Sponsored Conferences

The Oxford International Conference on the Science of Botanicals (ICSB) is hosted and co-sponsored annually by the National Center for Natural Products Research along with CFSAN/FDA, The Shanghai Institute of Materia Medica/CAS in China, The Council of Scientific and Industrial Research (CSIR - India) and The Society for Medicinal Plant Research (GA).

## Funding

Research is funded from a variety of sources including FDA, NIH/NIAID/NCI, DOD, NSF, EPA, NOAA/Sea Grant, USDA, WHO and industry. The School of Pharmacy has been in the top 5 in the nation among U.S. Schools of Pharmacy in total federal funding for the last five years.

## Technologies Available for Licensing Can be Viewed at:

[http://www.olemiss.edu/depts/research/technology/technology\\_licensing.html](http://www.olemiss.edu/depts/research/technology/technology_licensing.html)

For more information contact:



Walter G. Chambliss, Director  
techgmt@olemiss.edu

Division of Technology Management, Office of Research and Sponsored Programs  
<http://www.olemiss.edu/depts/research/>

Research Institute of Pharmaceutical Sciences  
School of Pharmacy  
<http://www.pharmacy.olemiss.edu/rips/>

## UNIVERSITY OF MISSISSIPPI PHARMACEUTICAL DEVELOPMENT PIPELINE

ID/Field/Stage	Description	Licensing Status	Patent Status
UM1760/1820 CANCER -Preclinical	<b>Novel Compounds that are Inhibitors of HIF-1.</b> In vivo xenograft data suggests that UM1760 may act by blocking HIF-1 mediated survival and angiogenic pathways.	<ul style="list-style-type: none"> <li>Available</li> </ul>	<ul style="list-style-type: none"> <li>Pending</li> </ul>
UM1530 CANCER -Preclinical	<b>Dihydroartemisinin and Dihydroartemisitenone Dimers.</b> Several semisynthetic compounds have shown potent, differential activity in NCI's 60-cell line panel and hollow fiber assay. Two compounds, 1 oral and 1 subQ, have been selected for development. A significant number of animal pharmacology and toxicology studies have been conducted by the NCI. These compounds are active in vivo (in xenograft models) as single agents and have substantial anti-metastatic activity.	<ul style="list-style-type: none"> <li>Available</li> </ul>	<ul style="list-style-type: none"> <li>6,790,863</li> <li>7,098,242</li> <li>Other's pending</li> </ul>
UM1470 CANCER -Preclinical	<b>Chembranoids with Chemopreventive Activity.</b> Compounds have exhibited improved inhibitory effects on Epstein-Barr virus early antigen activation and promising in vivo inhibition of tumor promotion by a reduction in % incidence and multiplicity of papillomas in a mouse skin carcinogenesis model.	<ul style="list-style-type: none"> <li>Available</li> </ul>	<ul style="list-style-type: none"> <li>Pending</li> </ul>
UM1300 ANTI-INFECTIVE -Preclinical	A synthetic <b>8-aminoquinoline</b> for the treatment of malaria, leishmaniasis and <i>Pneumocystis</i> pneumonia.	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>6,376,511</li> </ul>
UM1330 API - Drug Master File	<b>Cannabis Extract</b>	<ul style="list-style-type: none"> <li>Licensed (Non-Exclusive)</li> </ul>	<ul style="list-style-type: none"> <li>6,365,416</li> <li>6,730,519</li> </ul>
UM1160 CANCER (NAUSEA) AND PAIN -Phase I Complete	<b>Dronabinol Hemisuccinate Suppositories</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>5,389,375</li> <li>5,508,037</li> </ul>
UM1320 API - Pre-Drug Master File	<b>Dronabinol Hemisuccinate</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>6,008,383</li> <li>Other's Pending</li> </ul>
UM1410 IMMUNE SUPPORT - Commercialized as a Dietary Supplement	<b>Microalgae Extract</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>7,205,284</li> <li>Patent's Pending</li> </ul>
UM1420 IMMUNE SUPPORT - Clinical Trials as a Dietary Supplement	<b>Aloe Extract</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>7,196,072</li> <li>Patent's Pending</li> </ul>
UM1550 Anti-infective - Preclinical	<b>Improved API</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>Pending</li> </ul>
UM1520 VARIOUS CATEGORIES - Phase I Completed	<b>Oral Mucosal Delivery of API's</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>5,375,953</li> </ul>
UM1460 VARIOUS CATEGORIES - Phase II Completed	<b>Bioadhesive Gel for Mouth Ulcers</b>	<ul style="list-style-type: none"> <li>Licensed</li> </ul>	<ul style="list-style-type: none"> <li>5,112,620</li> <li>5,714,165</li> </ul>

For more information contact:



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techmgmt@olemiss.edu

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School of Pharmacy

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