



THE PATH TO DISCOVERY

Biomedical Research at the University of Iowa Carver College of Medicine

More than ever, biomedical research is part of our daily lives. Headlines celebrate the latest findings from fields like genetics and nutrition. Funding for research continues to grow. People live longer, better lives thanks to the work of biomedical researchers.

At an academic medical center like University of Iowa Health Care, discoveries made in the laboratory are also used at the bedside. Leading physicians and scholars are drawn to the UI by the opportunity to conduct groundbreaking research and to practice the cutting-edge medicine those studies support.

But for these talented UI faculty members, research is not just about advancing scientific knowledge. It's also about teaching tomorrow's science and health professionals. This is why academic medical centers like the UI dominate the lists of the top teaching hospitals.

Regardless of whether they go on to become researchers, UI students who take part in research gain essential problem-solving skills, familiarity with scientific methods, and, very often, a drive to keep asking "Why?"

TWO TYPES OF BIOMEDICAL RESEARCH:



BASIC RESEARCH

Basic research, also referred to as "bench" research, happens in laboratories. It's focused on exploring the most basic functions of living systems, from humans down to single-cell organisms. It often uses model systems like human or animal cells, simple organisms like fruit flies or yeast, or higher animals like mice and rats.



CLINICAL RESEARCH

Clinical research involves human subjects who volunteer to take part in scientific studies. This type of research happens in hospitals, doctors' offices, and communities. Clinical research includes trials that test new treatments and therapies as well as observational studies that help physicians see how a disease changes over time.

THE DISCIPLINES THAT DRIVE RESEARCH: BASIC SCIENCES

Disciplines in the basic sciences are often interrelated, and all have roots in biology, chemistry, or physics. The UI Carver College of Medicine includes these basic science departments:

Anatomy and Cell Biology: Studies the development of body structures and fundamental processes that are important for cells to function.

Biochemistry: Studies molecules and chemical reactions and how they control bodily functions.

Microbiology: Researches the function of microorganisms like bacteria and viruses and how they may impact human health.

Molecular Physiology and Biophysics: Applies principles from physics to solve biological problems and characterizes processes that are important for particular bodily functions.

Pharmacology: Investigates drugs and their effects, particularly for therapeutic uses.

KEEPING IT SAFE AND SOUND: RESEARCH ETHICS

To make sure researchers conduct ethical clinical research, institutions like the UI establish Institutional Review Boards (IRBs) that evaluate all studies using human participants. IRBs are made up of scientists, faculty members, and lay people.

Clinical research volunteers must be told what may happen during a study, including any risks. Research participants' identities must be protected, and information about their health histories must be kept confidential.

Another committee at the UI pays special attention to research involving radiation or radioactive materials, X-rays, or lasers, ensuring that studies conform to current regulations and practices.

And research projects that involve animals also are strictly controlled and monitored.



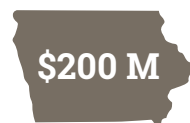
CAREERS IN BIOMEDICAL RESEARCH

Biomedical research requires teams of people drawn from different backgrounds and specialties, most with education beyond the four-year college degree. A strong grounding in science, including basic education in science, is good preparation for a career in biomedical research, but individuals choose disciplines depending on their strengths or interests.

Most basic scientists hold doctor of philosophy (PhD) degrees, also referred to as doctorates, in scientific disciplines. Many biomedical researchers, particularly those who perform clinical research, are physicians with doctor of medicine (MD) degrees.

A relatively small number of researchers hold both PhD and MD degrees, with training in both medicine and a basic science. The UI Carver College of Medicine is home to a nationally recognized Medical Scientist Training Program that trains physician-scientists.

Some individuals train to become laboratory professionals, assisting lead investigators on research projects. Professionals from fields like engineering, statistics, information technology, social work, and the social sciences also take part in biomedical research, as do some individuals with business, law, or humanities backgrounds.



BOOSTING IOWA'S ECONOMY

Research at the UI Carver College of Medicine plays an important role in the state economy, bringing in more than \$200 million in funding each year — making it **one of the largest employers in the state of Iowa.**

Some research can result in the invention of new procedures and technology. The UI helps bring these efforts to public use through “technology transfer,” a program that allows private companies to use intellectual property created at universities.

Some new ideas are the basis for their own business. The UI makes it possible for faculty, staff, and students to connect with expertise, develop new product lines, and connect businesses with rights to products and technology developed by university innovators.

