

# Discovery and Analytical Sciences



RTI International conducts a wide range of research in the life sciences, with an emphasis on programs in human health, agriculture, and the environment. We apply interdisciplinary expertise in biological, chemical, environmental, agricultural, social, and forensic sciences to provide solutions to societal needs.

Researchers at RTI conduct basic, applied, and translational research to support clients and address priorities of funding agencies in government, academia, industry, and other sectors. Project teams are led by experienced principal investigators and other senior scientists.

### Expertise

- Analytical and bioanalytical chemistry
- Biorepository operations
- Pharmacology
- Toxicology (preclinical, reproductive, and developmental)
- Neurotoxicology, developmental neurotoxicology
- Microscopy and microanalysis
- Proteomics
- Genomics and metagenomics
- Populomics
- Behavior science
- Neuroimaging
- Waste conversion
- Microbiology
- Proficiency testing
- Biomarkers and systems biology
- Bio- and cheminformatics
- Micro-macro plant interactions
- Plant and microbial biotechnology
- Ethnobotany
- Computational biology
- Pharmaceutical sciences
- Small molecule design and synthesis
- Metallomics
- Environmental sciences and ecology
- Phytoremediation and site management

### Pharmaceuticals and Biotechnology

Drug discovery and development are core research activities at RTI. Our team of medicinal chemists, pharmacologists, toxicologists, and other scientists work with pharmaceutical companies and government agencies to bring new medicines to market. We develop new processes—based on synthetic biology, for example—to exploit plants and microorganisms for the production of high-value-added compounds.

We provide targeted consultation to help clients understand the market potential of current intellectual property (IP) assets and analyze existing assets or technologies for potential investment to create additional IP to take the science to the next step.

### Air Quality

We conduct basic and applied research in support of air quality measurement and monitoring. We develop and evaluate methods for measuring and analyzing particulate matter, asbestos, metals, bioaerosols, and organic contaminants. Our microbiologists study environmental causes of allergy and asthma, impacts of new technologies on the environment and human health, and bioterrorism-associated biological aerosols.

We are the sole contractor selected by the U.S. Environmental Protection Agency to perform chemical speciation for the nationwide network of PM<sub>2.5</sub> monitoring sites. Drawing on this experience, we also advise national and local governments seeking to establish air quality monitoring programs and build capacity for environmental data collection and analysis around the world.



### Pharmaceutical Research Programs

- Drug discovery and development
- *In vitro* and *in vivo* pharmacology and assay development
- Neuropharmacology
- Models for neurodegenerative diseases
- Organic synthesis, medicinal chemistry, and lead optimization
- Preclinical metabolism, pharmacokinetic, and toxicology research
- Analytical, bioanalytical, and pharmaceutical sciences

### Air Quality Research Programs

- Air sampling and speciation of particulate matter
- Organic and inorganic analyses
- Efficiency testing of filtration media
- Bioaerosol research
- Laboratory proficiency testing
- Auditing of air quality monitoring sites
- Training, capacity building in air monitoring
- Modeling and source apportionment



### Personalized Medicine

At RTI we have integrated programs in genetics, neurobiology, environmental science, and human health to define disease states and states of wellness and susceptibility to disorders and disease. The goal of these programs is to devise medical, psychosocial, and public health interventions and policies that promote the implementation of personalized and preventive medicine.

#### Personalized Medicine Research Programs

- Genomics
- Proteomics
- Transdisciplinary science and translational prevention
- Metabolomics and obesity research
- Biomarkers and systems biology
- Human microbiome
- Populomics, spatial, and systems sciences
- Risk behaviors and addiction research
- Environmental genomics

### Human Exposure

RTI conducts numerous studies to help understand the interaction between human health and exposures to natural and man-made environmental contaminants. We develop and apply methods for chemical analysis and toxicological testing in support of government and private-sector goals to ensure the safety of chemicals used in industrial and consumer products.

### Agriculture

We conduct basic and translational research in the area of agricultural and environmental biotechnology. Our experts study critical plant-microbe interactions, physiological processes, and metabolomic modeling, and exploit these interactions to address pressing issues in food production, such as efficiency of water and fertilizer utilization, to improve national and global food security while helping promote sustainable agriculture.

We also study the scientific and public policy aspects of environmental contamination and bioremediation as part of integrated land management strategies. Our work seeks to advance the understanding of the benefits and potential environmental challenges presented by nanotechnology, biofuels, and other new technologies.

#### Human Exposure Research Programs

- Testing toxicity of commodity chemicals under TSCA, FIFRA, or OECD
- Environmental disease, including allergy and asthma
- Measurement and management of emissions and exposure
- Analyses of particulate pollutants, aerosols, biologicals, bioaerosols
- Laboratory proficiency testing
- Aerosol challenge testing for protective garments
- Health effects of exposure to commodity chemicals and environmental contaminants
- Facility, systems, and instrument auditing for environmental quality assurance
- Human neurotoxicity and health outcomes

#### Agriculture Research Programs

- Agricultural enhancement
- Environmental biotechnology
- Agricultural waste conversion
- Ethnobotany
- Food diagnostics
- Alternative crop use
- Global climate change





## Forensics

Our forensic scientists use rigorous, transdisciplinary approaches to advance basic and applied knowledge and inform national and international policy, practice, and programs.

We develop and evaluate methods to improve practice in postmortem forensic toxicology, forensic operations and reporting systems, and data collection and analysis. We also provide reference materials and conduct performance testing to verify the performance of drug testing laboratories across the United States.

Under a contract with the Department of Justice, RTI develops web-based

training courses for forensic scientists in the United States and internationally. By reducing time and cost commitments, our courses allow laboratory managers to more efficiently meet continuing education requirements.

### Forensics Research Programs

- Proficiency testing
- Reference standards
- Oversight of accreditation and certification programs
- Education and training
- Microbial forensics
- Development of analytical techniques for testing for controlled substances

### Clients and Funding Agencies

- National Institute of Environmental Health Sciences
- National Institute on Drug Abuse
- Environmental Protection Agency and state agencies
- Substance Abuse and Mental Health Services Administration
- National Institute of Mental Health
- National Institute of Neurological Disorders and Stroke
- Department of Defense
- Department of Justice
- National Cancer Institute
- Commercial and international clients

### More information

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RTI International is one of the world's leading research institutes, dedicated to improving the human condition by turning knowledge into practice. Our staff of more than 2,800 provides research and technical services to governments and businesses in more than 40 countries in the areas of health and pharmaceuticals, education and training, surveys and statistics, advanced technology, international development, economic and social policy, energy and the environment, and laboratory testing and chemical analysis. For more information, visit [www.rti.org](http://www.rti.org).

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