

Pharma | Medical Device | Animal Health
PRECLINICAL DEVELOPMENT PARTNER

mdb

CONTRACT RESEARCH...SPECIALIZED BY CHOICE



“Throughout our relationship, you have been attentive to our needs and have completed exploratory pilot studies and three drug studies with professionalism and an understanding of tight biotech timelines that are unmatched by other CROs.”

D.Z., Director of Biotherapeutics
Biotech Company

MD Biosciences began as a specialized service provider in Rheumatoid Arthritis. Our focus in inflammations research formed the foundation for the services and therapeutic focus we offer today. Since our inception, we have chosen a deliberate path of controlled growth to ensure we always deliver high quality service for our clients. Our services have expanded to include cell and tissue based screening, animal efficacy models and mechanism of action studies in the areas of Inflammatory Diseases, Neurological Diseases, and Pain Management. We'll continue to focus

on these core areas of expertise as we look to expand into other related disease fields in the future. Meanwhile, we continue to build our expertise with scientists who share our commitment to customer service, flexibility and responsiveness while maintaining our reputation for delivering quality results on time.

Our diverse experience encompasses a range of therapeutic areas, chemical entities, small molecules, biologics, and complex study designs.

FOCUSED ON YOUR PRODUCT DEVELOPMENT



“Among all the CROs that I have used over the years, including recently for inflammation, MD Biosciences has been one of the very best in terms of scientific knowledge, expertise, data quality, timelines, flexibility and personal contacts.”

O.B., Director of Preclinical Research
Pharmaceutical Company

The more you understand, the clearer next steps become.

We believe that data should never be compromised by budgets. That’s why every study run with MD Biosciences is all-inclusive with sample harvesting and relevant readouts, such as histology. In addition to the included readouts, customized options are also available. Our all-inclusive studies provide a robust data package that enables clear next-step decisions.

Access to unrivaled expertise and support.

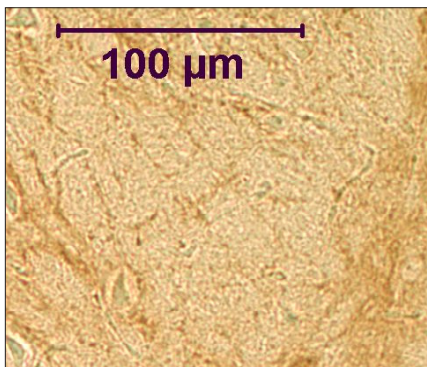
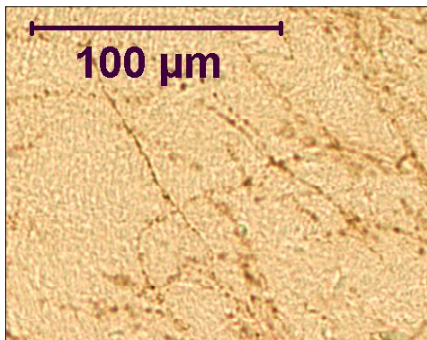
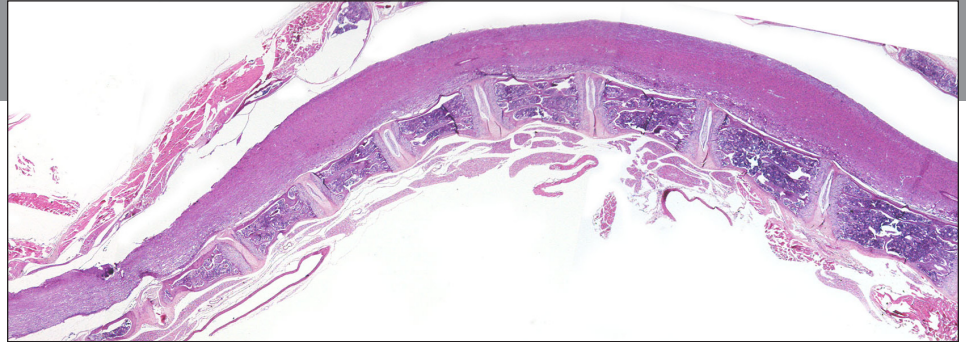
Every sponsor receives a team of scientists to act as their external advisory team to assist in pre-study consulting, protocol design and data analysis. This scientific

advisory group in addition to the scientific study team will bring over decades of high-level academic and industry experience, helping you navigate any obstacles while generating and maintaining your confidential intellectual property.

Flexibility and responsiveness to meet your commercial needs.

We know that you are working under pressure to get data quickly and cost effectively. You are likely faced with increasing budgetary and regulatory challenges. We are committed to providing flexibility that allows you to match our experience to your needs. We initiate studies quickly to provide quality data on time, which is critical in meeting your commercial needs.

HISTOLOGICAL ANALYSIS



Naïve (top) and diseased (bottom) samples at the level of Substantia Nigra pars compacta (SNpc) in acute model of MPTP-induced Parkinson's Disease

MD Biosciences provides histology, immunohistochemistry, and histopathological analysis to the pharmaceutical, biotech and life science industry. Our experienced and certified pathologists are available to prepare and interpret slides and as well as deliver in-depth analysis in a detailed report.

We incorporate histologic endpoints as part of our *in vivo* studies to maximize the value of the information as well as offer our histology capabilities as a stand alone service using the tissues you provide.

Our histology capabilities include:

- Routine paraffin slide preparation including gross trimming, processing, embedding, sectioning and staining
- Frozen sections

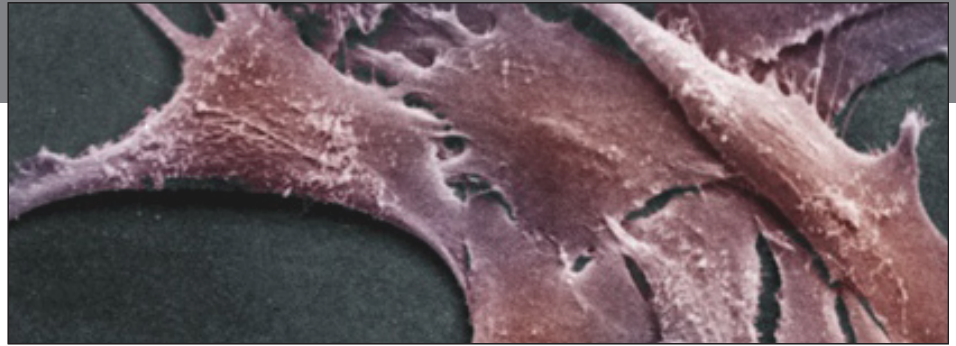
- IHC staining (eg. T cells and myelin proteins)
- Toxicology: histological analysis of any organ can identify lesions or other abnormalities

Standard and special stains include:

- H&E Staining
- LFB Staining for looking at demyelination
- Bielschowsky's Silver for axon degeneration
- Thionine for infarct size in ischemic brains
- PAS for mucous stain
- Sirius to determine collagen levels
- Luna staining

Other methods or stains are available upon request.

CELL & TISSUE BASED SCREENING ASSAYS



***In vitro* Assays are available using primary cells or immortalized cell lines for the following:**

Assay Types

Inflammation-related assays
Cell Signaling Pathway Screening Assays
Enzyme Inhibition Assays
Calcium Flux Assays
Adaptive Immune Response Assays
Medical Device Screening Assays

Cell Types

Monocytes/Macrophages
Neutrophils/Granulocytes
T-cells
Endothelial Cells
Epithelial Cells
Bronchial Smooth Muscle Cells
Synoviocytes
Chondrocytes
Fibroblasts

Please inquire about additional assays and cell types.

Cell based assays are quick and provide the ability to interpret and predict many biological properties of potential drug compounds. Cytokines and related molecules have been implicated in inflammatory diseases such as rheumatic disease, multiple sclerosis, asthma, inflammatory bowel disease, and autoimmune diseases as well as cancer and infectious diseases. These assays provide the ability to determine a potential compound's effect on cell proliferation, cytokine production and cellular responses.

MD Biosciences uses a number of primary and immortalized cell lines to assay test compounds for their effect on inflammatory mediator production, signal transduction pathway activation, transcription factor activity, gene expression and other specialized assays. Using these *in vitro* assays, compounds can be rapidly and cost effectively screened for activity prior to more expensive and time consuming *in vivo* analysis.

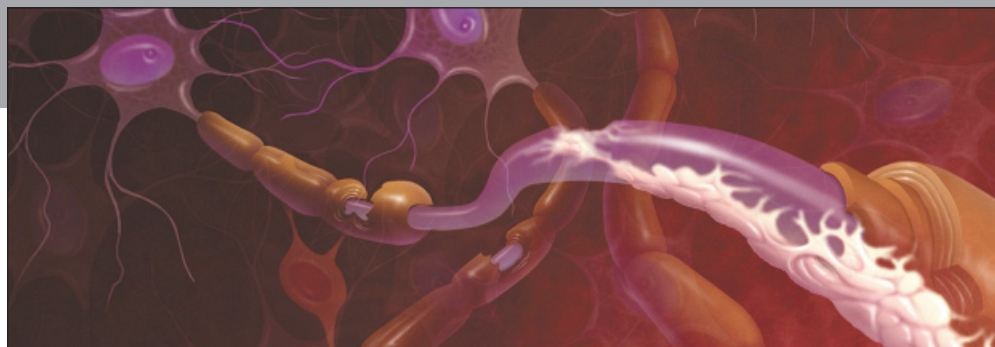
Our ImmuneProfiler™ screening program is a series of assays that can be used to better characterize the anti-inflammatory activity of a compound. Whole blood contains a number of immune cells such as monocytes, T cells, B cells and neutrophils. With ImmuneProfiler™ we can concentrate on a single cell type by altering whole blood fractionation and/or by changing the stimulant.

Using this series of assays, you can screen a compound through multiple systems or screen multiple compounds through one system looking at:

Monocyte/Macrophage Response
T cell Response
Neutrophil Function

In addition to our *in vitro* models, MD Biosciences offers pre-clinical analysis of client-generated samples such as serum, plasma, lavage fluid and urine.

EFFICACY DISEASE MODELS



Models of Inflammatory Diseases

Mono- and Polyarthritis
Osteoarthritis
Gout
Asthma
Lung Fibrosis
Lung Inflammation
Passive Cutaneous Anaphylaxis
Contact Dermatitis
Delayed Type Hypersensitivity
Inflammatory Bowel Disease
Endotoxic Shock
Air Pouch
Peritonitis

Models of Neurological Diseases

Multiple Sclerosis
Parkinson's Disease
Gliosis

Models of Pain

Nociceptive Pain
Inflammatory Pain
Arthritic Pain
Neuropathic Pain
Post-operative Pain
Diabetic Pain

Please inquire about additional models or custom model development.

Outsourcing your pre-clinical research to a dependable and trusted partner can save you time and money. Whether we supplement your in-house research capabilities or provide a complete outsourcing solution, MD Biosciences serves as an invaluable extension of your scientific team, allowing you to maintain your internal focus on your core strengths and competencies.

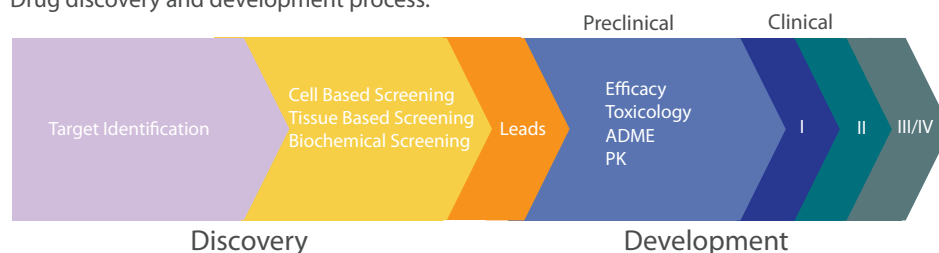
MD Biosciences has many years of experience performing efficacy studies in animal models. Our capabilities are designed to facilitate the validation of therapeutic targets and the identification of new potential indications for those targets.

The use of *in vivo* models allow researchers the ability to evaluate lead compounds under physiological conditions and observe interactions among the different cell types and tissues that will closely mimic the environment that the drug is intended for. We

recognize the value of data obtained in these animal models brings to pre-clinical research. Our services are designed to assess the therapeutic efficacy of optimized lead compounds and/or drug development candidates by analyzing their effects on key physiological functions in animals and screen for potential side effects caused by the administration of such compounds at various doses. Mechanism of action studies are designed to discover novel disease indications for compounds that were not previously known, thus expanding the market potential of those drug candidates.

MD Biosciences offers a well-rounded portfolio of standard efficacy models within our core focus of inflammations, neurology and pain. Each model is customized according to each sponsor's needs and includes valuable readouts such as histology to maximize the amount of information gained from a study. Custom model development is also available upon request.

Drug discovery and development process:



mdbiosciences.

Inflammation and Neurology Discovery Services

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