mlm medical labs®

Preclinical Research Services Catalog

GLP

BVMA certified (Germany)

ISO 15189 accredited

CLIA accredited

AAALAC accredited

About Us

MLM Medical Labs is a leading specialty and central laboratory with comprehensive research services and diagnostic capabilities in Europe and the United States. Offering a range of standard and fully customizable analytical services across a variety of therapeutic areas, we add value at every stage of the product development process from early stage R&D through phase IV clinical trials that serve to enhance and accelerate research programs to their next milestones. Each disease area is supplemented extensively by different models and batteries of *in vitro* and *ex vivo* analyses, offering answers to your therapeutics' effect on different biological systems. With our strong reputation for scientific expertise, passionate approach to customer care, and adherence to providing quality data, we empower clients ranging from emerging biotech to Top Ten Global Pharma companies to reach confident clinical decisions that ultimately serve to improve patient lives.

Our Core Values

Scientific Excellence

Customized Agile Solutions

Personal Accountability

We approach each project uniquely, hosting discussions to learn as much about our sponsors' programs as possible including the overall objectives of the study and the potential mechanisms of the test items upfront. We approach each customer with transparent sharing of information, coordinated decision-making processes, and a high level of flexibility, offering you global service without the bureaucracy. We run off-the-shelf models, customize existing models and develop novel approaches, whether it be a new model, delivery method or assessment. Furthermore, our biomarker development and clinical services teams will collaborate with our customers to realize diagnostic assays or *in vitro* diagnostic devices. We are committed to creating a lasting partnership that ensures delivery of the most informative and comprehensive data package possible from each study we perform.

IN VITRO CAPABILITIES

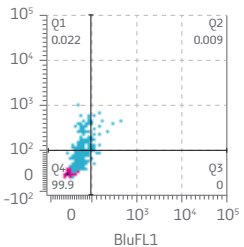
Screening and Mechanism of Action Studies

Cell Based Assays

Primary and immortalized cellular assays for compound screening, cytotoxicity testing, proliferation, cytokine production, disease modeling and more.

Flow Cytometry

Characterize complex cellular populations of interest with our standard and custom panels for immunophenotyping with BD LSR Fortessa.



Molecular Analytics

Analyze specific genes or pathways through PCR, DNA methylation determination, mRNA/miRNA expression levels and Next-Gen Sequencing.

Protein Analytics

Analyze biomarkers through singleplex, multiplex or ELISA-based technologies (up to 30 analytes per sample), Western Blot capabilities.

Histopathology

Our fully-equipped and GLP-compliant histopathology laboratory can provide in-depth tissue analysis through histological staining and immunohistochemistry on fresh frozen and FFPE samples.

Custom Assay Development

We specialize in assay development and validation to meet our customers' complex analytical needs. Contact us today to discuss a customized assay solution!

IN VIVO CAPABILITIES

Models for Efficacy and Pharmacology Studies

Our scientists aim to provide the biotech and pharmaceutical community with relevant disease models that translate to the clinic because the development of life-saving therapeutics depends on it. We offer traditional, well-characterized rodent models of numerous diseases and disorders that can be found in publications across the literature, and we continually develop new models on the background of existing models.

Combining the right models with the necessary readouts, both *in vivo* and *ex vivo*, brings a higher degree of applicability to the clinic in later stages of development and ultimately accelerates our client programs forward.

Drug Administration

All standard routes (IV, IP, Intradermal, etc) as well as intranasal, oral aspiration and infusion pump delivery.

Tissue Sampling and Histopathology

Harvesting of all tissue types for *ex vivo* analysis of biomarkers. Traditional pathological assesments as well as digital imaging and quantitative image analysis.

Model and Method Development

Small animal model development as well as method development to address unmet study needs.

New Chemical Entities (NCE), Biologics and Medical Devices

Experience in handling small molecules, biologics, cell-based therapies, natural compounds, medical devices and combination products.

CELL CULTURE MODELING

In Vivo & *In Vitro* Assays

We offer a variety of *in vivo* models and *in vitro* assays for evaluating select pathways. Sponsors can select pathways of interest, choose between stimulation or inhibition assays, evaluate in cell based or whole animal systems.

In Vivo Immune Response Models:

Category	Species	Response	Output
Cellular Immunity	Mouse	Th1 response	Cytokine panel, FACS
Cellular Immunity	Mouse	Th2 response	Cytokine panel, FACS
Cellular Immunity	Mouse	Th17 response	Cytokine panel, FACS
Cellular Immunity	Mouse	CD8 T cell response	Cytokine panel, FACS
Non-specific Immunity	Mouse	Innate	Cytokine panel, FACS
Humoral Immunity	Mouse	B cell response	FACS, cytokines
Humoral Immunity	Mouse	B cell activation	FACS
Allergy/Hypersensitivity	Mouse/rat	Th1	Cytokines panel, FACS
Allergy/Hypersensitivity	Mouse	Th2	Cytokines panel, FACS

In Vivo Immune Response Models:

Model	System	Stimulant(s)	Output
Custom Model	Custom	Custom	Cell proliferation, multiplex cytokine panel, ELISA, qPCR, FACS
PBMC Cellular Inflammation Model	Periperipheral blood mono-nuclear cells (PBMC)	Lipopolysaccharides (LPS), Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR, FACS
T Cell Activation	PBMC	antiCD3/CD28, ConA, PHA, Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR
In vitro B-cell stimulation/ activation	PBMC or B-cells	anti-CD40, anti-IgM/IgG, IL-4, Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR, FACS
M0/M1/M2 Macrophage Polarization Assay	Monocyte cell line THP-1	phorbol 12-myristate-13-acetate (PMA), LPS, IFN-gamma, IL-4, IL-13, Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR
TH17 Cell Differentation	CD4+ T cells	MACSiBeads (loaded with CD2, CD3, CD28 antibodies), Th-17 differentiation cocktail containing TH17 poloarizing cytokines (IL-1β, IL-6, IL-23, TGF-B1, anti-IFNγ, anti-IL-4), Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR, FACS
Fibroblast-like Synoviocyte Inflammation Assay	Healthy Human Fibroblast-like Synoviocytes (HFLS) or Rheumatoid Arthritis Patient (HFLS-RA)	TNF-α, Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR
Colonic Epithelial Cell Inflammation Assay	Colonic Epithelial Cells	TNF-α, IL17a, Sponsor Compound	Cell proliferation, multiplex cytokine panel, ELISA, qPCR

INFLAMMATION

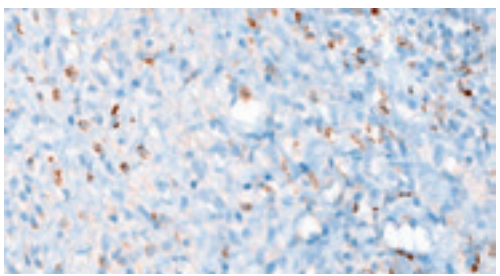
Inflammatory Assessments Across Multiple Disease Areas

Organ/Disease	Model	General Assessments
Rheumatoid Arthritis	• Collagen Induced Arthritis (CIA) • Collagen Antibody Induced Arthritis (CAIA) • Carrageenan Air Pouch • Carrageenan Induced Paw Edema	Histology/IHC, Flow Cytometry Biomarker Analysis, DNA/RNA Analysis, PK
Dermal Inflammation	• Imiquimod (IMQ) Induced Psoriasis • IL-23 induced Psoriasis • DNCB/FITC Induced Atopic Dermatitis • Oxazolone Delayed Type Hypersensitivity • Passive Cutaneous Anaphylaxis	
Respiratory/Lung	• Ovalbumin (OVA) Asthma • Lipopolysaccharide (LPS) Lung Inflammation/Injury • House Dust Mite (HDM) Asthma • HDM + LPS Asthma • Bleomycin induced IPF	
Fibrosis	• Diet Induced NASH • Bleomycin Induced Systemic Sclerosis	
Sepsis	• LPS-Induced Septic Shock • BSL-2 Grade Facility and can work under SPF conditions for microbiome related studies • Cecal-Ligation Puncture (CLP)	
Inflammatory Bowel Disease	• Dextransulfate Sodium (DSS)-induced ulcerative colitis • Trinitrobenzene sulfonic acid (TNBS)-induced Crohn's Disease	
Metabolic Disorder	• Feed Intake • Diet-induced obesity	Histology/IHC, Flow Cytometry, Biomarker Analysis, DNA/RNA Analysis, PK, Von Frey, Motor Function, Inflammation Score

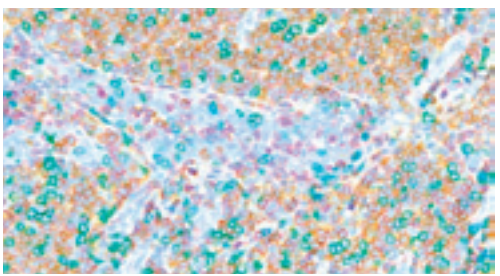
HISTOPATHOLOGY

Histological Assessment of all Tissue Types

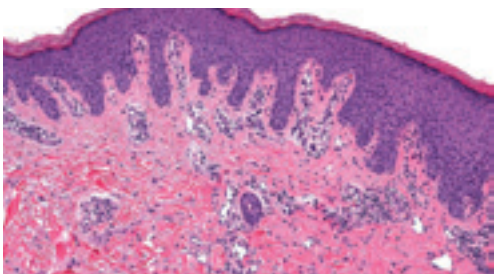
Histopathological evaluations form a highly valuable component of preclinical, translational, and clinical studies alike, providing additive spatial, contextual, and temporal information directly from tissues of interest. We offer a full-service GCLP and CLIA-certified histopathology laboratory that can provide in-house analysis of tissues, with capabilities for processing, embedding, microtomy, histochemical staining, immunohistochemical staining, immunofluorescent staining, and assessments. Our skilled team of histologists provide 20+ years of expertise to apply to each study that MLM performs, utilizing tissue specific staining optimization protocols for antibody validation and calibration, ensuring the highest quality of pathological assessment.



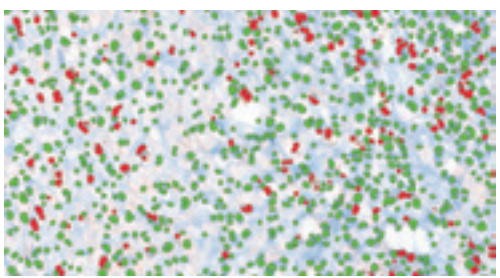
1a) IHC, MPO, skin punch, 20x



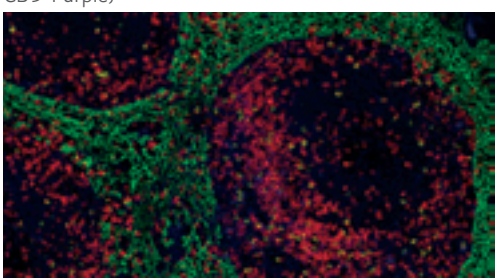
2a) Chromogenic triplex, tonsil, (CD8-Teal_CD4-Yellow_CD3-Purple)



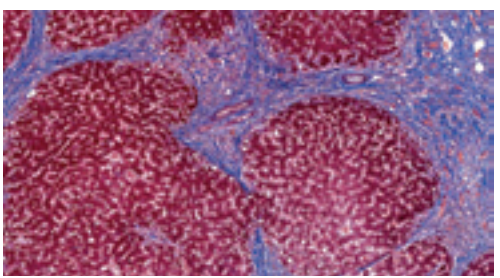
3a) H&E, Skin punch, 20x



1b) IHC, MPO, AI Overlay, skin punch, 20x



2b) IF Triplex, tonsil, (CD3-CY5_CD8-RG6_PanCK-FAM)

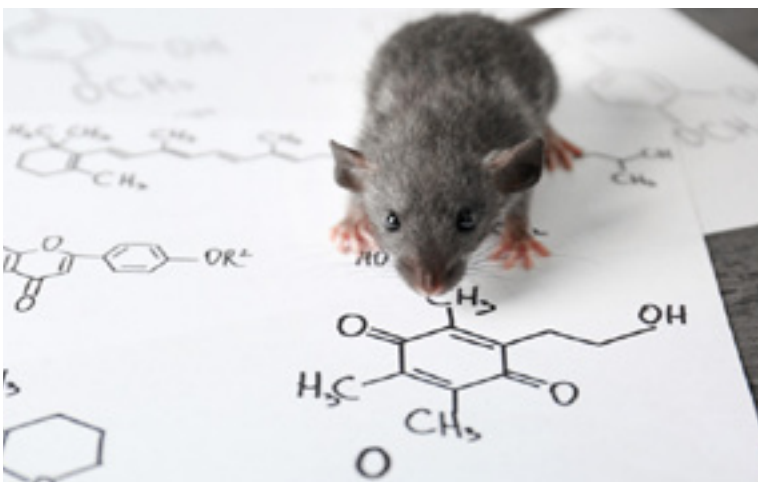


3b) Masson Trichrome, Liver, 20x

MODELS IN DEVELOPMENT

Available for Partnership and Cost-Sharing Opportunities

To meet the ever-changing demands of our client research programs, MLM Medical Labs® offers unique *in vitro* and *in vivo* model development capabilities for analysis of pharmaceutical, biologic and medical device products. Our laboratory can import and utilize nearly any readily available rodent strain, and has extensive experience creating novel models for custom investigational purposes. Combining the right models with the necessary readouts, both *in vivo* and *ex vivo*, brings a higher degree of applicability to the clinic in later stages of development and ultimately accelerates our client programs forward. Collaborative cost-sharing and partnership opportunities are available for those interested in exploring areas outside our present focus. Contact our scientists to discuss model development for your study needs.



Recently Validated Models

- CD4+ T-Cell Anergy Model (Staphylococcal enterotoxin B-induced, performed in Balb/c mice)
- Th17 Cell Differentiation Model (Anti-CD3 antibody-induced, performed in C57/BL6 mice)
- Hair Growth Model (Performed in B6C3F1/J mice)
- Scleroderma / Systemic Sclerosis Model (mice CD-1 or C57BL/6)
- NASH Model (mice C57BL/6)

CONTACT US!

Speak with a scientist today to discuss your next study!

 @MLMMedicalLabs

 @mlm-medical-labs

MLM Medical Labs GmbH

Dohrweg 63
41066 Mönchengladbach
Germany

Phone: +49 2161 46 42 -0
Fax: +49 2161 46 42-190

MLM Medical Labs Memphis

140 Collins Street
Memphis, TN 38112
USA

Phone: +1 901 866 1700
Fax: +1 901 866 1702

MLM Medical Labs Minneapolis

3510 Hopkins Place N
Oakdale, MN 55128
USA

Phone: +1 651 641 1770
Fax: +1 651 641 1773

www.mlm-labs.com