Our Research and Development Department has experience performing assays in the fields of Molecular Biology, Serology and Immunology, Cell Biology and Pharmacokinetics, and Scientific Software Development. Please peruse our listings which can help to further your research goals:

Molecular Biology

PCR-Based Prevalency Screening - MDL is a leading clinical diagnostic laboratory and has the capability to screen your samples for dozens of pathogens through the use of primers tested for specificity and sensitivity. If your pathogen of interest is not already included in our extensive menu of testing, we can custom design and validate a new assay for your research needs.

Real-time PCR assay development - We have experience in designing assays for DNA or RNA detection and quantification with highly sensitive and specific real-time PCR techniques.

Pyrosequencing - We can provide up to 35 bases of a specific PCR product's sequence directly from a PCR reaction.

Pyrosequencing assay development - We have experience in designing assays for using Pyrosequencing to obtain sequence of PCR products, especially in conjunction with real-time PCR.

Genetic Subcloning - We can subclone a DNA sequence of interest into a plasmid vector. Genetic variations including site-directed mutagenesis, insertions, deletions, and frameshifts can also be accommodated.

Protein Expression and Purification - After subcloning of the DNA encoding your protein into an expression vector, milligram quantities can be expressed and purified for further biochemical assays.

Western, Northern, and Southern blots - Screen for proteins, RNA, or DNA of interest utilizing antibodies or radiolabeled nucleotide probes.

Positive control generation for PCR studies - If you only have a very limited source of positive control template DNA, we can subclone it into a plasmid vector for an unlimited source.

Baculoviral protein expression - Alternate method for expression and purification of proteins in a eukaryotic system.

Library construction - Preparations of genomic DNA or cDNA can be subcloned into various library vectors for maintenance and screening.

Library screening - After constructing a specific library, it can be used to find full-length cDNAs or used in screens to find genes with novel functions.

Yeast one hybrid - A system for determining the interaction between DNA and a protein or a cDNA expression library. It is performed in yeast cells.

Yeast two hybrid - A system for determining protein-protein interactions between two proteins of interest or one protein and a cDNA expression library. The technique is performed in yeast cells.

Mammalian one/two hybrid - A technique as described for the yeast one/two hybrids except it is performed in cultured mammalian cells.

Mammalian protein-protein interaction reporter assay development - We have experience in designing assays for custom needs, such as screening a provided compound library for the ability to disrupt a particular protein-protein interaction.

Bacterial species identification - Through the use of PCR and universal 16S bacterial DNA primers, the identification of unknown samples can be made at the species taxonomic level.

Gel Electromobility Shift Assays - DNA sequences containing protein binding sites are radiolabeled; if protein extracts contain these specific DNA binding proteins, a shift in size will be evident on the reducing gel based upon the formation of a protein-DNA structure.

Transcription Reporter Assays - After subcloning the DNA containing a gene promoter region into a reporter vector, transcriptional control under various conditions can be analyzed.

RNase Protection Assays - A highly sensitive and quantitative means for detecting specific mRNA species.

***In Vitro* Translation** - Cell-free protein expression can be performed using rabbit reticulocyte lysates.

Serology and Immunology

Recombinant Antigen Preparation - A genetic sequence can be subcloned into expression cassettes and purified, recombinant peptide fragments provided for further analysis.

ELISA development - Whole cell lysates from bacterial or eukaryotic cells can be utilized as substrates for the development of an ELISA test.

Immuno-fluorescent microscopy/imaging - We use state-of-the-art equipment designed for fluorescent microscopy and imaging.

Cell Biology and Pharmacokinetics

Cell Culture - Established and primary cell lines can be maintained at MDL. Cells can be frozen or protein, RNA, or genomic DNA extracts provided.

***In Vitro* drug efficacy studies** - Eukaryotic or prokaryotic cells can be incubated with antibiotics or other agents and viability assessed.

Mammalian cell transformation - After subcloning a gene of interest into a mammalian expression vector, the gene can be introduced into established cell lines via electroporation, calcium phosphate, or commercially available lipid/chemical methods.

Educational training is available.