

Products for Immunology & Cell Biology Research

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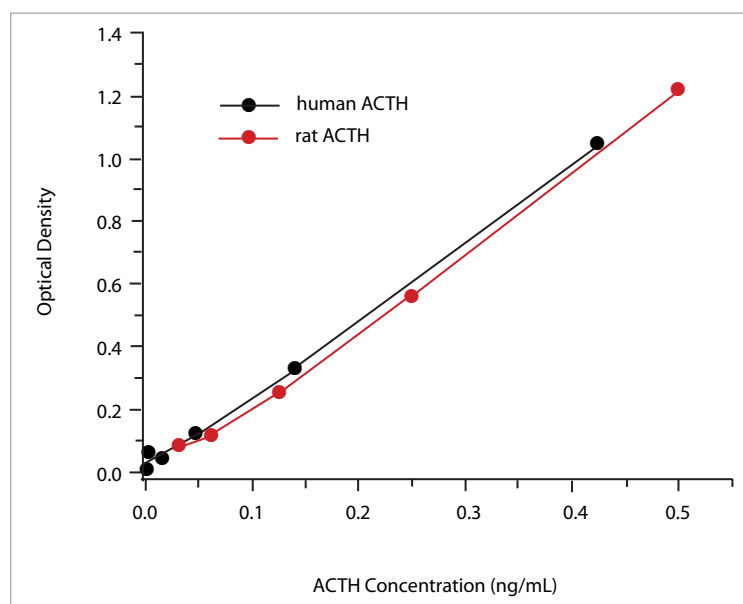
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Immunoassays

Enzyme-linked immunosorbent assays (ELISAs) can provide a useful measurement of antigen or antibody concentration in a biological sample. They combine the specificity of antibodies coupled with an easily assayed enzyme such as horseradish peroxidase. There are several types of ELISA assays, mainly “indirect,” “competitive” and “sandwich,” where antigen/antibody interactions are detected by the enzyme, which converts it to a detectable signal. MD Bioproducts ELISAs are manufactured to provide ease of use for the researcher. Our quality control program ensures that results are sensitive, precise and reproducible.

ACTH ELISA

ACTH (Adrenocorticotrophic hormone) or corticotropin is a 39-amino acid peptide hormone (MW=4500) secreted by the pituitary to regulate the production of steroid hormones by the adrenal cortex. ACTH secretion from the anterior pituitary is controlled by both a classical negative feedback control mechanism and CNS-stress mediated control system. Various types of stress or pain perceived in higher levels of the brain modulate secretion of the hypothalamic neurosecretory hormone, corticotropin releasing hormone (CRH), a 41-amino acid peptide. CRH stimulates pituitary ACTH secretion. The second peptide that modulates ACTH secretion is vasopressin (AVP). AVP secretion is also stimulated by stress and acts synergistically with CRH to increase ACTH secretion in the pituitary portal circulation. ACTH increases the synthesis and release of all adrenal steroids, aldosterone, cortisol and adrenal androgens. It is the principal modulator of cortisol, the most important glucocorticoid in man. As the cortisol level in blood increases, release of ACTH is inhibited directly at the pituitary level. Through this same mechanism, decreasing cortisol levels lead to elevated ACTH levels.



Calibration curve showing the correlation of rat and human ACTH samples.

Product	Species	Range	Assay Time	Catalog Number
ACTH ELISA	human, mouse, rat	0 - 500 pg/mL	4.5 hours	M046006

Calcitonin ELISA Kit

Calcitonin, a 32-amino-acid polypeptide, is secreted primarily by the thyroidal parafollicular C-cells. Its biological effects include the ability to inhibit osteoclastic bone resorption as well as playing a role in calcium and phosphorus metabolism in the bone and kidney. Calcitonin suppresses resorption of bone by inhibiting the activity of osteoclasts

releasing calcium and phosphorus into blood. In the kidney, calcium and phosphorus are prevented from being lost in urine by reabsorption in the kidney tubules. Calcitonin inhibits tubular reabsorption of these two ions, leading to increased rates of their loss in urine.

Product	Species	Range	Assay Time	Catalog Number
Calcitonin ELISA Kit	human	10 - 1000 pg/mL	4.5 hours	M046010

Erythropoietin (EPO) ELISA

The EPO ELISA is intended for the quantitative determination of Erythropoietin (EPO) in human serum. This assay is for research use as an aid in the diagnosis of anemias and polycythemias. With the advent of the administration of recombinant erythropoietin as a

biologic therapy to increase red blood cell mass, the erythropoietin assay may be used also to aid in the prediction and monitoring of response to recombinant erythropoietin treatment in persons with anemias.

Product	Species	Range	Assay Time	Catalog Number
Erythropoietin (EPO) ELISA	human, mouse, rat	7.5 - 500 mU/mL	2.5 hours	M046013

Intact PTH ELISA

PTH (Parathyroid hormone, Parathormone, Parathyrin) is biosynthesized in the parathyroid gland as a pre-proparathyroid hormone, a larger molecular precursor consisting of 115 amino acids. Following sequential intracellular cleavage of a 25-amino acid sequence, pre-proparathyroid hormone is converted to proparathyroid hormone, a 90-amino acid polypeptide. With additional proteolytic modification, proparathyroid hormone is then converted to parathyroid hormone, an 84 amino acid polypeptide. In healthy individuals, regulation of parathyroid hormone secretion normally occurs via

the negative feedback action of serum calcium on the parathyroid glands. Intact PTH is biologically active and clears very rapidly from the circulation with a half-life of less than four minutes. PTH undergoes proteolysis in the parathyroid glands, but mostly peripherally, particularly in the liver but also in the kidneys and bone, to give N-terminal fragments and longer lived C-terminal and midregion fragments. In subjects with renal insufficiency, C-terminal and midregion PTH assays typically give elevated PTH results, as reflected by impaired renal clearance.

Product	Species	Range	Assay Time	Catalog Number
Intact PTH ELISA	human	7 - 700 pg/mL	3.5 hours	M046016

Rat Prolactin ELISA

Prolactin (PRL) or Luteotropic hormone (LTH) is a peptide hormone with a molecular weight of 24,000 daltons and a structure that is similar to that of growth hormone and placental lactogen. It is primarily associated with pregnancy and lactation and is expressed

in the anterior pituitary, uterus and placenta. During pregnancy, high circulating concentrations of estrogen promote prolactin production. The resulting high levels of prolactin secretion cause further maturation of the mammary glands, preparing them for lactation.

Product	Species	Range	Assay Time	Catalog Number
Rat Prolactin ELISA	rat	0.39 - 50 ng/mL	overnight incubation	M046017

β-Endorphin ELISA

β-endorphin is an endogenous opioid peptide neurotransmitter found in the neurons of both the central and peripheral nervous system. It is 31 amino acids long resulting from processing of the precursor proopiomelanocortin (POMC), which also gives rise to other

peptide hormones including ACTH (Adrenocorticotrophic hormone) and α- and γ-MSH (Melanocyte-Stimulating Hormone). β-endorphin is an agonist of opioid receptors giving it analgesic properties.

Product	Species	Range	Assay Time	Catalog Number
β-Endorphin ELISA	human, mouse, rat	0.01 - 100 ng/mL	4 hours	M056011

Leucine-Enkephalin ELISA

An enkephalin is a pentapeptide involved in regulating nociception in the body. The enkephalins are termed endogenous ligands, or specifically endorphins, as they are internally derived and bind to the body's opioid receptors. They function as neurotransmitters or neuromodulators and inhibit neurotransmitters in the pathway for pain perception. There are two forms of enkephalin, one containing leucine,

and the other containing methionine. These two neuropeptides can depress neurons throughout the central nervous system. Although it is not known exactly how these neuropeptides function, the enkephalins are natural pain killers and may be involved, with other neuropeptides, in the development of psychopathologic behavior in some cases.

Product	Species	Range	Assay Time	Catalog Number
Leucine-Enkephalin ELISA	human, mouse, rat	0.01 - 100 ng/mL	4 hours	M056014

Substance P ELISA

Substance P is a neuropeptide that functions as a neurotransmitter and as a neuromodulator. It is found in the brain and spinal cord, and is associated with inflammatory processes in the joints, causing arthritic pain, as well as low back pain and fibromyalgia. Substance P

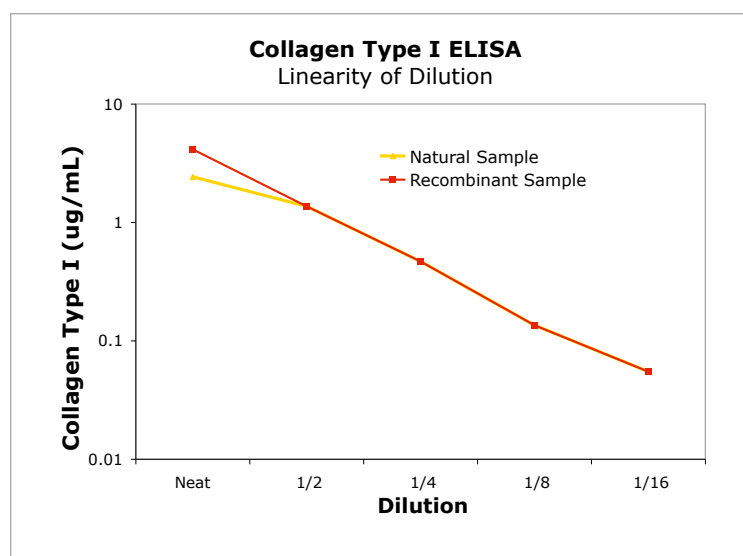
and other neuropeptides can be released from sensory nerve fibers in the skin, muscle and joints causing a local inflammatory response to certain types of infection or injury.

Product	Species	Range	Assay Time	Catalog Number
Substance P ELISA	human, mouse, rat	0.04 - 25 ng/mL	4 hours	M056018

Collagen Type I ELISA

Collagen Type I (CI) is the most abundant protein and is found in the skin, connective tissue, tendons, ligaments, cornea, intervertebral discs and bone. It is encoded by the genes COL1A1 and COL1A2 and is formed inside (along the rough endoplasmic reticulum) and outside (by procollagen peptidase and bound by fibronectin and integrin) the cell. Individual collagen molecules are cross-linked to one another within these fibrils. The formation of cross-links results in very strong type I collagen fibrils, which are found in the spaces around cells. Collagen Type I is involved in many human diseases such as fibrosis, osteoporosis, cancer and atherosclerosis.

Right : Human dermal fibroblasts were digested with pepsin, serially diluted and assayed in the MD Bioproducts Collagen Type I ELISA. Natural samples dilute linearly in comparison to the recombinant standard supplied with the kit.

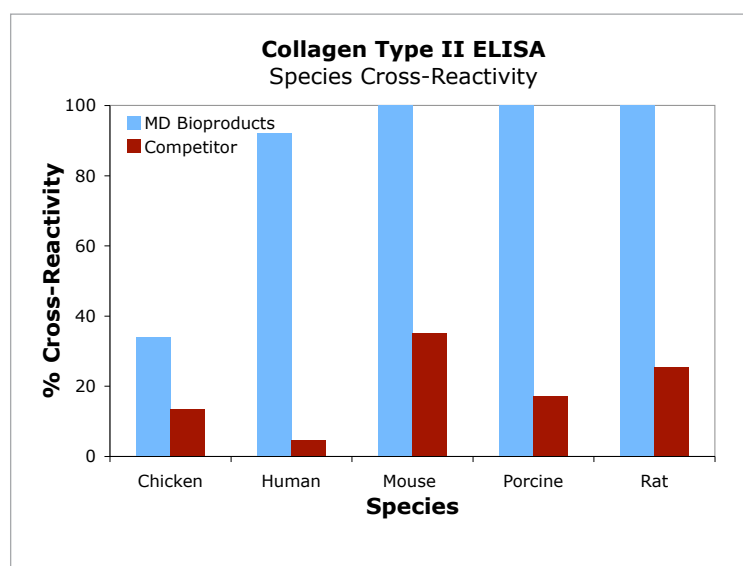


Product	Species	Range	Assay Length	Catalog Number
Collagen Type I ELISA	human	0.062 - 5 µg/mL	2 hours 40 min	M036007

Collagen Type II ELISA

Collagen Type II (CII) is the principle collagenous component of cartilage, intervertebral disc and vitreous humor. It is encoded by the gene COL2A1, which forms the alpha-1 chain. Three proalpha 1 chains are twisted together to form a triple-stranded, rope-like procollagen molecule, which must be processed by enzymes in the cell. Once these molecules are processed, they leave the cell and form a fibrillar network of collagen allowing cartilage to trap proteoglycan aggregate. The main function of collagen type II is to provide tensile strength and give cartilage the ability to resist shearing forces.

Right: Cross-reactivity was determined in MD Bioproducts and a competitor Collagen Type II Assay using various species of collagen type II. MD Bioproducts' CII ELISA exhibits good cross-reactivity with various species of Collagen Type II expanding the utility of the ELISA.



Product	Species	Range	Assay Length	Catalog Number
Collagen Type II ELISA	bovine, chick, human, mouse, porcine, rat	4.7 - 300 ng/mL	4 hours 50 min	M036000

Mouse IgG anti-Collagen Type II ELISAs

The Collagen-induced arthritis (CIA) model is one of the most widely used models for the study of Rheumatoid Arthritis (RA). Collagen type II (CII) in adjuvant is used to induce arthritis by triggering autoreactive B cells, which play an important role in the development of arthritis. This B cell response to CII is strictly T cell dependent, where the B cells predominantly switch isotype to IgG.

The Mouse anti-Collagen Type II ELISAs allow you to measure IgG, IgG2a and IgG2b antibodies generated against the species of collagen used in the induction of arthritis in mice.

Product	Species	Range	Assay Length	Catalog Number
Mouse IgG anti-Bovine Collagen Type II ELISA	mouse	6.17 - 500 ng/mL	2.25 hours	M036001-B
Mouse IgG anti-Chicken Collagen Type II ELISA	mouse	6.17 - 500 ng/mL	2.25 hours	M036001-C
Mouse IgG anti-Human Collagen Type II ELISA	mouse	6.17 - 500 ng/mL	2.25 hours	M036001-H
Mouse IgG anti-Mouse Collagen Type II ELISA	mouse	6.17 - 500 ng/mL	2.25 hours	M036001-M
Mouse IgG anti-Porcine Collagen Type II ELISA	mouse	6.17 - 500 ng/mL	2.25 hours	M036001-P
Mouse IgG anti-Rat Collagen Type II ELISA	mouse	6.17 - 500 ng/mL	2.25 hours	M036001-R

Product	Species	Range	Assay Length	Catalog Number
Mouse IgG2a anti-Bovine Collagen Type II ELISA	mouse	1.56 - 25 ng/mL	2.75 hours	M036002-B
Mouse IgG2a anti-Chicken Collagen Type II ELISA	mouse	1.56 - 25 ng/mL	2.75 hours	M036002-C
Mouse IgG2a anti-Human Collagen Type II ELISA	mouse	1.56 - 25 ng/mL	2.75 hours	M036002-H
Mouse IgG2a anti-Mouse Collagen Type II ELISA	mouse	1.56 - 25 ng/mL	2.75 hours	M036002-M
Mouse IgG2a anti-Porcine Collagen Type II ELISA	mouse	1.56 - 25 ng/mL	2.75 hours	M036002-P
Mouse IgG2a anti-Rat Collagen Type II ELISA	mouse	1.56 - 25 ng/mL	2.75 hours	M036002-R

Product	Species	Range	Assay Length	Catalog Number
Mouse IgG2b anti-Bovine Collagen Type II ELISA	mouse	0.025 - 2.0 ng/mL	< 2.75 hours	M036003-B
Mouse IgG2b anti-Chicken Collagen Type II ELISA	mouse	0.025 - 2.0 ng/mL	< 2.75 hours	M036003-C
Mouse IgG2b anti-Human Collagen Type II ELISA	mouse	0.025 - 2.0 ng/mL	< 2.75 hours	M036003-H
Mouse IgG2b anti-Mouse Collagen Type II ELISA	mouse	0.025 - 2.0 ng/mL	< 2.75 hours	M036003-M
Mouse IgG2b anti-Porcine Collagen Type II ELISA	mouse	0.025 - 2.0 ng/mL	< 2.75 hours	M036003-P
Mouse IgG2b anti-Rat Collagen Type II ELISA	mouse	0.025 - 2.0 ng/mL	< 2.75 hours	M036003-R

Aggrecanase

The Aggrecanase Activity Assay measures activity of aggrecanases and is used to screen and characterize aggrecanase inhibitors. This assay consists of two modules, the Aggrecanase Module and the ELISA Module. In the Aggrecanase Module, a recombinant fragment of human aggrecan interglobular domain (aggrecan-IGD) is first digested with aggrecanase. Proteolytic cleavage of the substrate releases an aggrecan peptide with the N terminal sequence ARGSVIL (ARGSVIL-peptide). The ARGSVIL-pep-

tide is then quantified in the ELISA Module using two monoclonal anti-peptide sequence antibodies.

The Sensitive Aggrecanase Activity assay measures activities of aggrecanase in the pM concentration range. The high sensitivity is achieved with an engineered aggrecanase substrate derived from aggrecan interglobular domain.

Product	Species	Range	Assay Length	Catalog Number
Aggrecanase Activity Assay	human	0.062 - 4 nM	3.75 hours	M046008
Sensitive Aggrecanase Activity Assay	human	0.022 - 1.4 nM	3.75 hours	M046009

Animal COMP ELISA

Cartilage oligomeric matrix protein (COMP), also designated thrombospondin 5 (TSP 5), is non-collagenous glycoprotein and is a member of the thrombospondin family of extracellular proteins. COMP is a calcium-binding protein of high molecular weight (>500kDa) present in the extracellular matrix of articular, nasal and tracheal cartilage. COMP is not only cartilage-derived but was found widely in other tissues, including synovium and tendon. COMP is released

in the blood when cartilage is destroyed and can be used prognostically for cartilage destruction in inflammatory joint diseases such as Rheumatoid Arthritis (RA) and Osteoarthritis (OA). A quantitative relation between COMP concentration in serum and the degree of cartilage destruction has been shown.

Product	Species	Range	Assay Length	Catalog Number
Animal COMP ELISA	bovine, mouse, goat, pig, sheep, rat	up to 0.9 U/L	3 hours	M046012

Activated MMP-13 ELISA

Matrix Metalloproteinases (MMP) comprise a family of secreted and membrane-bound endopeptidases that hydrolyze extracellular matrix proteins (ECM). MMP mediated ECM degradation affects processes such as connective tissue remodeling, cell migration and cell micro-environment regulation. MMPs further affect cellular behav-

ior by modulating activities of cytokines, growth factors, cell surface receptors and other MMPs. In addition to their normal function in developmental and repair processes, inappropriate MMP activity also participates in disease processes including arthritis and cancer.

Product	Species	Range	Assay Length	Catalog Number
Activated MMP-13 ELISA	human	32 - 3000 pg/mL	4.25 hours	M046015

IgE ELISAs

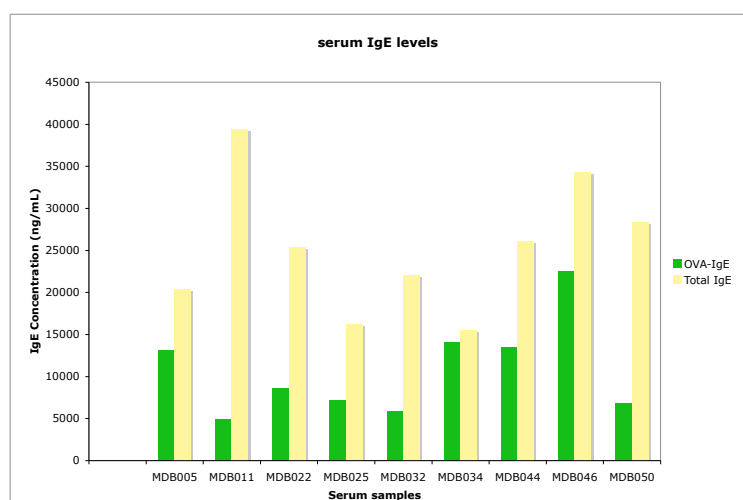
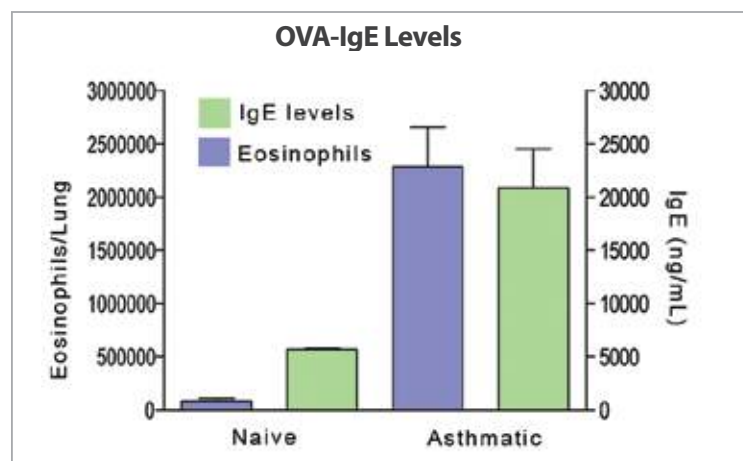
IgE is the least abundant isotype but has the capability of triggering a powerful immune response by binding to Fc receptors on the surface of cells such as mast cells, basophils, eosinophils, monocytes, macrophages and platelets. It is well known for its involvement in eliciting an allergic or asthmatic response.

Allergic asthma is typically triggered by allergens in the air such as pollen, mold, and dust mites. It can be characterized by reversible airway obstruction, elevated levels of IgE causing mast cell activation, chronic airway inflammation and airway hyper-responsiveness. The immunological processes involved are characterized by proliferation and activation of Th2 lymphocytes. The Th2 mediated allergic inflammation is accomplished with the following cytokines:

IL-4 induces differentiation of CD4 T cells into Th2 cells, induces the proliferation of activated B cells and is the major cytokine involved in B cell class switching to IgE. IL-5 is involved in eosinophil activation and also facilitates B cell growth and antibody production.

In addition to inducing IgE production, IL-13 can induce AHR, goblet cell metaplasia and airway glycoprotein hypersecretion, which all contribute to airway obstruction.

While we know that Th2 lymphocytes play an important role in the initiation, progression and persistence of allergic asthma, there is much to be understood about the immunoregulatory mechanisms. Ovalbumin (OVA) is widely used for inducing an allergic response in mouse models of allergic asthma. Through T and B cell signalling, IgE production is stimulated and released into the bloodstream where it attaches to receptors on cells such as mast cells and basophils. These cells are then activated upon cross-linking of the IgE with the antigen initiating the allergic cascade. The asthma induction process also results in significantly more anti-OVA IgE in the serum of mice.



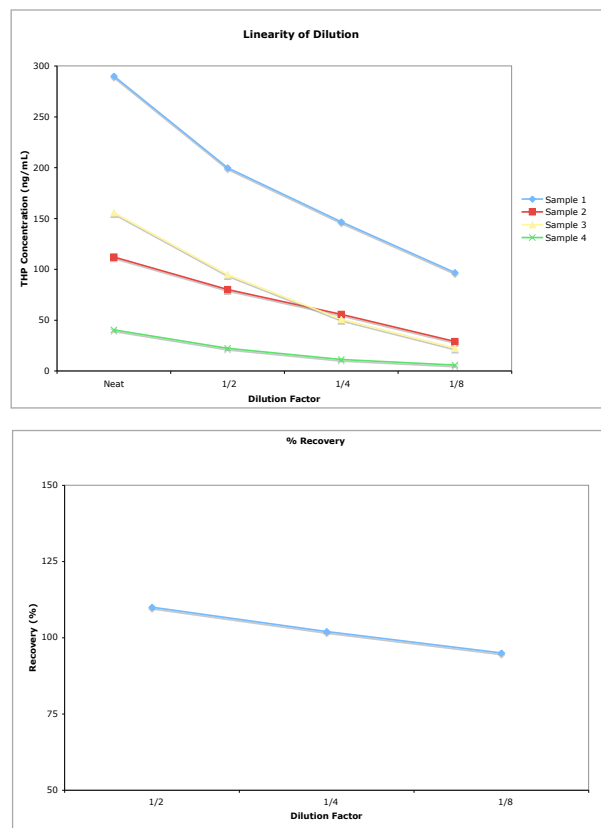
Top: Eosinophils in BAL fluid and serum OVA-IgE levels were evaluated from naive and asthmatic mice. Bottom: Serum samples from the mouse OVA-induced asthma model were assayed for Total and OVA-specific IgE levels.

Product	Species	Range	Assay Length	Catalog Number
Mouse OVA-IgE ELISA	mouse	7.8-500 ng/mL	2.25 hours	M036005
Total IgE ELISA	mouse	15.6-500 ng/mL	2.25 hours	M036023

Tamm-Horsfall Glycoprotein ELISA (THP, Uromodulin)

Tamm-Horsfall glycoprotein (THP, also known as uromodulin) is the most abundant protein found in the urine of mammals. THP is 616 amino acids in length with a molecular weight of 80 kDa, and is synthesized in the thick ascending loop of Henle. While the specific function of THP is unknown, it appears to have a role in the regulation of salt and water excretion by the kidney. Soluble THP has been found to help protect against urinary tract infections of *E. coli* and *P. mirabilis* by inhibiting the binding of the bacteria to the epithelial cells of the urinary tract. In addition, it has been suggested that THP may help prevent renal stone formation. Defects in THP are associated with human diseases such as familial juvenile hyperuricemic nephropathy (FJHN) and medullary cystic kidney disease (MCKD2).

Figures: (Top) Four different human urine samples were assayed for linearity of dilution in the THP ELISA. Samples were initially diluted 1:100 (displayed as neat) and serially diluted to 1:8. Initial sample values fall across the range of the curve as expected with urine samples and linearity is observed at both the upper and lower end of the curve. (Bottom) Average mean recovery is 102%.



Product	Species	Range	Assay Length	Catalog Number
Tamm-Horsfall Glycoprotein (THP) ELISA	human, canine	2.34 - 150 ng/mL	2 hours 40 min	M036020

Vitamin H (Biotin) ELISA

Biotin, also known as vitamin H, is of great importance for the biochemistry of the human organism. As a prosthetic group of mitochondrial enzymes (carboxylases), biotin plays a central role as a CO₂-carrier in important metabolic reactions such as gluconeogenesis, synthesis of fatty acids and metabolism of amino acids. Furthermore, biotin influences the growth and maintenance of blood cells,

sebaceous glands, skin, hair and nails. Next to the free form of biotin, the biotin linked to lysin, also known as biocytine, can also be utilized as a vitamin source by the body, after cleavage from the protein by the enzyme biotinidase.

Product	Species	Range	Assay Length	Catalog Number
Vitamin H (Biotin) ELISA	human	12.3 - 1000 ng/L	1.5 hours	M046019



Disease Induction Reagents

2

In vivo disease 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 for which the drug is intended. For researchers who have the ability to run *in vivo* disease models in-house, MD Bioproducts provides the reagents and technical assistance.

ArthritoMab™ Antibody Cocktail

Collagen-induced arthritis (CIA) in mice is widely used as an experimental model for Rheumatoid Arthritis (RA) in humans. CIA is mediated by autoantibodies, which bind to a particular region of collagen type II (CII). These autoantibodies take about 21-24 days to develop, causing the model to be long and the disease progression unsynchronized between animals. By using a cocktail of antibodies specific to the epitopes that are highly associated with arthritis, the disease development time can be greatly reduced to 24-48 hours.

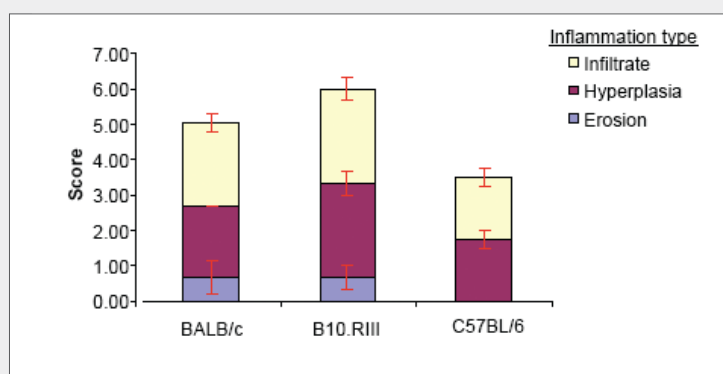
The ability to induce arthritis using this arthritogenic antibody cocktail provides an efficient protocol for the induction of antibody-mediated arthritis. Therefore, the Collagen Antibody Induced Arthritis (CAIA) model is a shorter, more synchronized alternative to the CIA model.

Benefits of using ArthritoMab™:

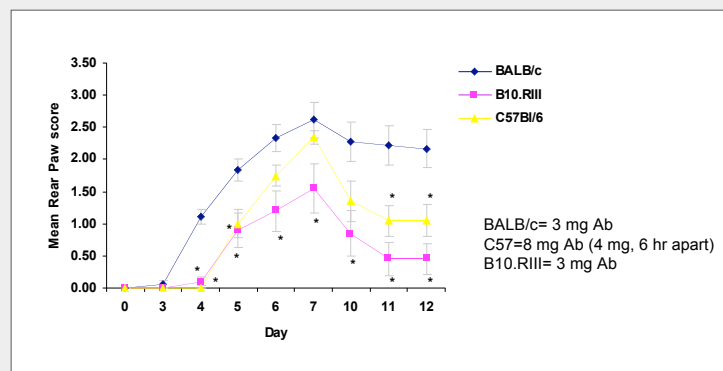
- **Time:** The model is induced by administration of cocktail followed by an LPS boost. Disease symptoms are apparent within 24-48 hours with results obtained in as little as 10 days allowing the rapid progression of studies.
- **Synchronicity:** Disease onset is synchronized simplifying the treatment schedules and provides a more direct comparison between test groups in the same study.
- **Incidence:** Disease incidence is nearly 100% potentially reducing the group size and allowing for more significant read-outs from individual studies.
- **Susceptibility:** The CAIA model is not limited to CIA susceptible strains and can be expanded into a variety of transgenic strains.
- **Flexibility:** The protocol can be altered for various study lengths, disease severity and disease pathology pathways. Extending the model to 18 days allows for a 6 day recovery phase, which can reveal the ability of a test item to promote arthritis resolution.

Product	Qty/Size	Catalog Number
ArthritoMab™ Antibody Cocktail*	50 mg**	CIA-MAB-50
ArthritoMab™ Antibody Cocktail* for C57Bl/6	50 mg	CIA-MAB-2C

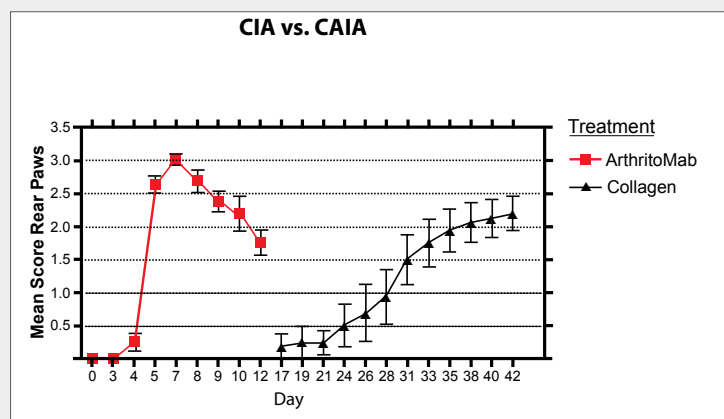
*LPS provided. **Bulk quantities available. Please inquire.



Histology in various strains.



Arthritis scores in various strains.



Incidence in CAIA goes from 0 to 100% within 48 hours of giving LPS, but incidence in CIA does not reach 100% until 10 days after collagen boost.

Whitepaper available for download. Please visit our website at www.mdbioproducts.com.

Purified Collagen Type II

Collagen Type II is the principal collagenous component of cartilage, intervertebral disc and vitreous humour. It is also found in other tissues during development. Its main function is to provide tensile strength and give cartilage the ability to resist shearing forces. Susceptibility to collagen type II and Adjuvant-induced CIA is linked

to MHC class II molecules and is dependent upon the species of collagen type II used for immunization. Various species of highly purified (>99%) Collagen Type II are supplied lyophilized and in solution for use in the induction of arthritis *in vivo*.

Product	Qty/Size	Catalog Number
Bovine Collagen Type II, lyophilized	10 mg	804001-lyo
Bovine Collagen Type II, soluble	5 mL (2 mg/mL)	804001-sol
Chicken Collagen Type II, lyophilized	10 mg	804002-lyo
Chicken Collagen Type II, soluble	5 mL (2 mg/mL)	804002-sol
Rat Lathrytic Collagen Type II, soluble	0.5 mL (1 mg/mL)	8041005-A
Rat Lathrytic Collagen Type II, soluble	1.0 mL (1 mg/mL)	8041005-B
Rat Pepsin-Digested Collagen Type II, soluble	0.5 mL (1 mg/mL)	8041006-A
Rat Pepsin-Digested Collagen Type II, soluble	1.0 mL (1 mg/mL)	8041006-B

Myelin Related Peptides

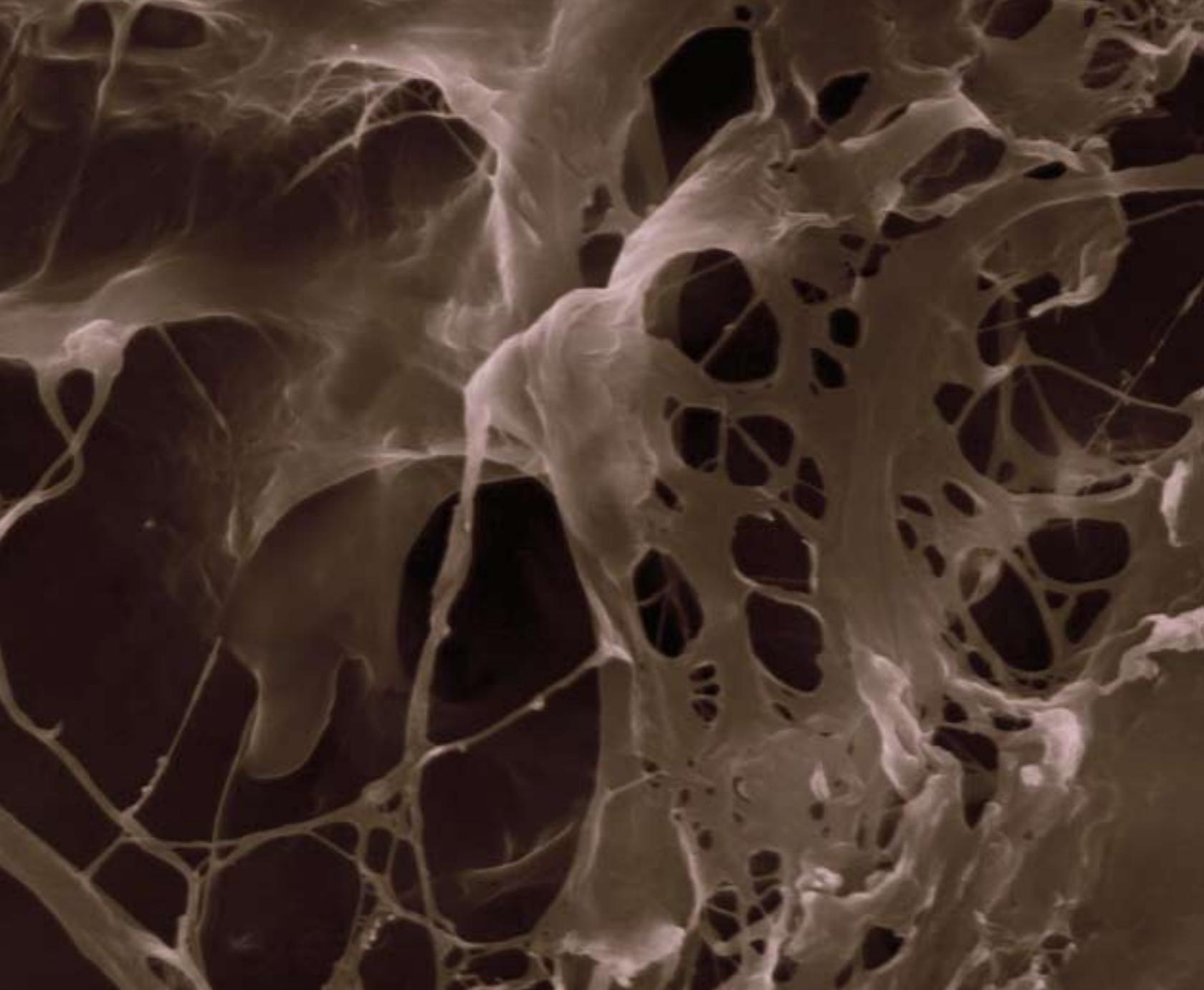
Multiple Sclerosis (MS) is a demyelinating disease of the Central Nervous System (CNS). The main characteristics of the disease are focal areas of demyelination and inflammation, however the pathogenesis is unclear.

Although no animal model thus far establishes all facets of human MS, Experimental Autoimmune Encephalomyelitis (EAE) represents the model most studied for the disease. Initially brain homogenates were used as antigens for immunization. Today, myelin related proteins or peptides are used in the disease.

Product	Qty/Size	Catalog Number
Myelin Proteolipid Protein (PLP 139-151)	15 mg	301008
Myelin Oligodendrocyte Glycoprotein (MOG 35-55)	25 mg	3038001

Adjuvants

Product	Qty/Size	Catalog Number
Complete Freund's Adjuvant (CFA), 4 mg/mL	5 mL	501009
Complete Freund's Adjuvant (CFA), 3 mg/mL	5 mL	501010
Incomplete Freund's Adjuvant (IFA)	5 mL	501011



3

Natural & Recombinant Proteins

The choice to use recombinant protein or a protein derived from a natural source can largely depend on how much material is required and ease of extraction from the source. Typically recombinant proteins are overexpressed in a bacterial, yeast or mammalian systems, giving greater yield of pure protein per gram than can be obtained from natural sources. MD Bioproducts has both natural and recombinant proteins for use in immunology and cell biology research.

Collagen/Extracellular Matrix Proteins

Collagen Type II is the principal collagenous component of cartilage, intervertebral disc and vitreous humour. It is also found in other tissues during development. Its main function is to provide tensile strength and give cartilage the ability to resist shearing forces. Collagen Type II and Adjuvant Susceptibility to CIA is linked to MHC

class II molecules and is dependent upon the species of collagen type II used for immunization. Various species of highly purified (>99%) Collagen Type II are supplied lyophilized and in solution for use in the induction of arthritis *in vivo*.

Product	Qty/Size	Catalog Number
Bovine Collagen Type II, lyophilized	10 mg	804001-lyo
Bovine Collagen Type II, soluble	5 mL (2 mg/mL)	804001-sol
Chicken Collagen Type II, lyophilized	10 mg	804002-lyo
Chicken Collagen Type II, soluble	5 mL (2 mg/mL)	804002-sol
Rat Lathrytic Collagen Type II, soluble	0.5 mL (1 mg/mL)	8041005-A
Rat Lathrytic Collagen Type II, soluble	1.0 mL (1 mg/mL)	8041005-B
Rat Pepsin-Digested Collagen Type II, soluble	0.5 mL (1 mg/mL)	8041006-A
Rat Pepsin-Digested Collagen Type II, soluble	1.0 mL (1 mg/mL)	8041006-B

Proteases

Proteases, also known as proteinases or proteolytic enzymes, are a large group of enzymes that are involved in digesting long protein chains into short fragments, splitting the peptide bonds that link amino acid residues. Some of them can detach the terminal amino acids from the protein chain (exopeptidases) and

others attack internal peptide bonds of a protein (endopeptidases). Proteases are divided into four major groups according to the character of their catalytic active site and conditions of action: serine proteinases, cysteine proteinases, aspartic proteinases, and metallo-proteinases.

Product	Source	Qty/Size	Catalog Number
Human Neutrophil Elastase	human neutrophils	10 µg	5028032-10
Human Neutrophil Elastase	human neutrophils	200 µg	5028032-200
rhHtrA1 (his-tagged)	insect cells	5 µg	5028031-A
rhHtrA1 (his-tagged)	insect cells	100 µg	5028031-100
rhHtrA3 (his-tagged)	insect cells	5 µg	5044011
rhHtrA4 (his-tagged)	insect cells	5 µg	5044012
rhHtrA4 truncated (his-tagged)	<i>E. coli</i>	5 µg	5044013
MMP-13 (his-tagged)	<i>Sf-29</i>	5 µg	5044010

Th2 Markers

Product	Source	Qty/Size	Catalog Number
rhST2	<i>E. coli</i>	10 µg	5043020-A
rhST2	<i>E. coli</i>	100 µg	5043020-B

Proteoglycans

Proteoglycans are a major component of the animal extracellular matrix where they form large complexes, with other proteoglycans, hyaluronan, and collagen. They are involved in regulating the movement of molecules through the matrix and can affect the activity and stability of proteins and signalling molecules within the matrix. The inability to break down proteoglycans is characteristic of a group of genetic disorders and leads to a variety of disease symptoms, depending upon the type of proteoglycan that is not degraded.

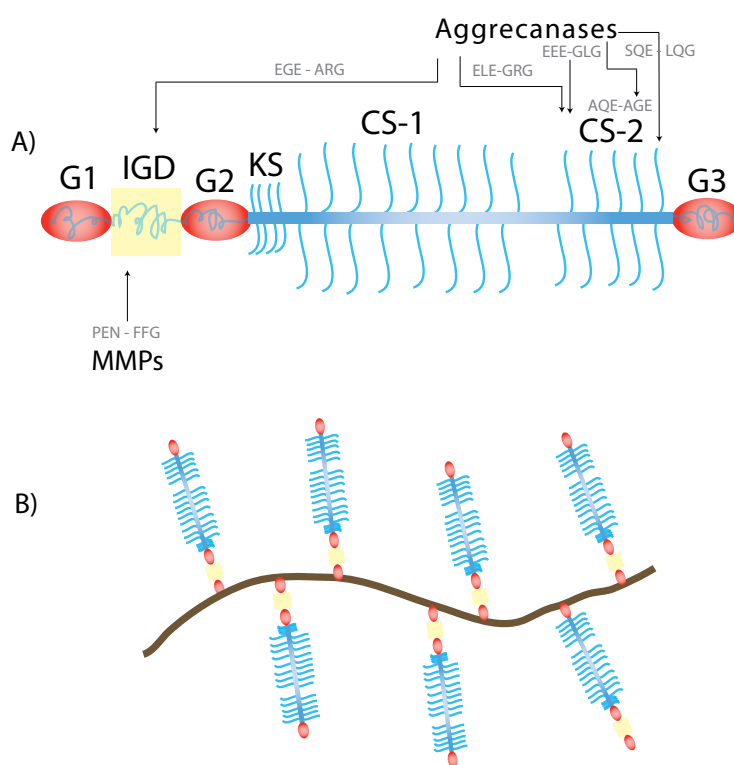
Proteoglycans can be categorized depending upon the nature of their glycosaminoglycan chains (chondroitin sulfate, dermatan sulfate, heparan sulfate and keratan sulfate) as well as characterized by size.

Aggrecan is an example of a large proteoglycan. It is present in articular cartilage and is responsible for hydrating cartilage, giving it compressibility and resilience during joint loading, thereby playing a major role in the normal function of cartilage. Depletion of glycosaminoglycan bearing aggrecan fragments is one of the earliest events in cartilage destruction.

Aggrecan monomers consist of a 250 kDa core protein and three globular domains, G1, G2, and G3. With the attachment of a chondroitin sulfide (CS) chain at the c-terminus and a keratan sulfide (KS) chain at the n-terminus, the monomer exists as a 1000-2000 kDa molecule. It is retained within the collagen network as an aggregate by interaction through the G1 domain and hyaluron, resulting in a large aggregate containing up to 100 aggrecan monomers, which is weaved into the collagen network.

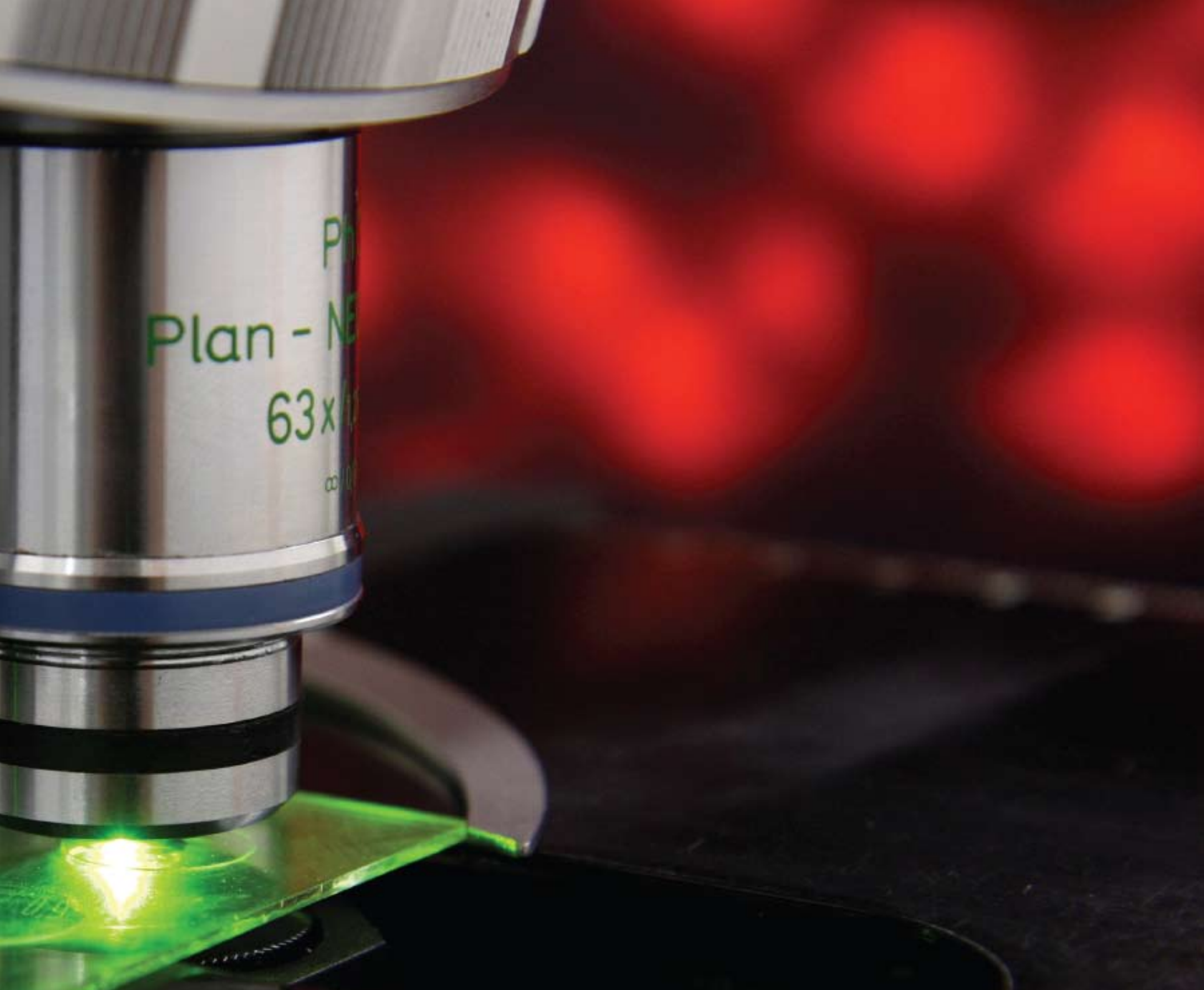
Proteolytic cleavage of its interglobulin domain (IGD) results in release of aggrecan fragments from tissue, which eventually leads to loss of joint function. This cleavage has been attributed to metalloprotease activity. Members of the matrix metalloprotease (MMP) family that are present in cartilage (MMP-2, -3, -7, -8, -9, -13,

and -14) are capable of degrading aggrecan between the Asn341 and Phe324 amino acids within the IGD, while members of the ADAMTS family (ADAMTS4 and ADAMTS-5/11 referred to as aggrecanase-1 and -2 respectively) are capable of degrading aggrecan at the Glu373 and Ala374 amino acids. In addition, ADAMTS4 also cleaves the relevant aggrecanase sites within the CS2 domain. The major portion of aggrecan released from tissue appears to be cleaved by aggrecanases, and this release eventually leads to loss of joint function in diseases such as Rheumatoid Arthritis and Osteoarthritis.



A) aggrecan monomer showing proteolytic cleavage sites
B) aggregate showing aggrecan monomers bound to hyaluronic acid

Product	Source	Qty/Size	Catalog Number
rhADAMTS4 (Aggrecanase 1), truncated, His-tagged	insect cells	5 µg	5028001-A
rhADAMTS4 (Aggrecanase 1), truncated, His-tagged	insect cells	100 µg	5028001-B
rhADAMTS1 truncated, His-tagged	insect cells	5 µg	5028002-A
rhADAMTS1 truncated, His-tagged	insect cells	100 µg	5028002-B
rhADAMTS5, His-tagged	baculovirus	5 µg	5044014
rAggrecan Interglobular Domain	<i>E. coli</i>	100 µg	5028003-A
rAggrecan Interglobular Domain	<i>E. coli</i>	500 µg	5028003-B
Proteoglycan, Joint cartilage	human Joint cartilage	1 mg	5028045
Proteoglycan, Septum cartilage	human Septum cartilage	1 mg	5028044



Antibodies

4

Purified monoclonal and polyclonal antibodies are commonly used to identify and locate intracellular and extracellular proteins. Flow cytometry applications differentiate cell types by the proteins they express, whereas immunoprecipitation applications separate proteins from other molecules in a cell lysate. Western blotting is also used to identify proteins that are separated by electrophoresis. Immunohistochemistry or immunofluorescence can be used to examine whether protein expression is present in tissue sections or cells. To quantify proteins, ELISA and ELISPOT techniques can be used.

Antibodies to Citrullinated Extracellular Matrix Proteins

Citrullination of proteins is a post translational modification where arginine is converted into citrulline by a family of enzymes called peptidylarginine deaminases (PADs). Proteins are susceptible to

citrullination during inflammatory processes and an autoantibody response to citrullinated proteins is a hallmark of Rheumatoid Arthritis.

Product	Qty/Size	Application	Catalog Number
Monoclonal Antibody to Citrullinated CII (Clone ACC-1)	100 µg	ELISA, IHC	1041003
Monoclonal Antibody to Citrullinated CII (Clone ACC-4)	100 µg	ELISA, IHC	1041004

Antibodies to Extracellular Matrix Proteins

The extracellular matrix (ECM) is the extracellular part of tissue that provides structural support to the cells in addition to performing various other important functions. The ECM includes the interstitial matrix and the basement membrane. Interstitial matrix is present between various animal cells (i.e., in the intercellular spaces) and the basement membrane is a sheet-like deposition of ECM on which

epithelial cells rest. The ECM serves many functions, such as providing support and anchorage for cells, segregating tissues from one another, regulating intercellular communication and the cell's dynamic behavior. Formation of the ECM is essential for processes like growth, wound healing and fibrosis.

Product	Qty/Size	Application	Catalog Number
Purified rabbit anti-mouse type I, CnBr fragment (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044004
Purified rabbit anti-mouse type I/III, CnBr fragment (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044005
Purified rabbit anti-human type I (pAb)	0.5 mL	ELISA, IFA, IHC, WB	203001
Purified rabbit anti-rat type I (pAb)	0.5 mL	ELISA, IFA, IHC, WB	203004
Monoclonal Antibody for Collagen Type II	100 µg	IHC	1041007
Monoclonal Antibody for Collagen Type II, Biotinylated	100 µg	IHC	1041007B
Purified rabbit anti-mouse type II, CnBr fragment (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044008
Purified rabbit anti-human type II (pAb)	0.5 mL	ELISA, IFA, IHC, WB	203001
Purified rabbit anti-mouse type III, CnBr fragment (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044007
Purified rabbit anti-mouse type IV (pAb)	0.5 mL	ELISA, IFA, IHC, WB	203003
Purified rabbit anti-human type V (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044001
Purified rabbit anti-mouse type V (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044008
Purified rabbit anti-human type VI (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044002
Purified rabbit anti-human type VII (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044003
Purified rabbit anti-rat type IX (pAb)	100 µg	ELISA, IFA, IHC, IB, IP	2044009

Abbreviations: Cell Sorting (CS), Immunoblot (IB), Immunofluorescence (IFA), Immunohistochemistry (IHC), Immunoprecipitation (IP), Flow Cytometry (FC)/FACS, Monoclonal Antibody (mAb), Polyclonal Antibody (pAb), Radioimmunoassay (RIA), Western Blot Analysis (WB)

Antibodies to Common Drug Compounds

Drug residues are a common and increasing concern globally. Drugs are obviously used to improve health in people and animals, however drug abuse in the veterinary industry and residues introduced into water systems are becoming increasingly widespread. When used appropriately, drugs reduce effects of disease or alter the course of disease but misuse is found in livestock producing food as well as in the racing industry. On the other side is the concern of drug residues

entering the water system through disposal or waste that is treated and recycled. An easy detection method for drug residues is and ELISA. Polyclonal antibodies to common drug classes such as NSAIDs, corticosteroids, DMARDs are available for use in ELISAs aimed at the detection of drug residues.

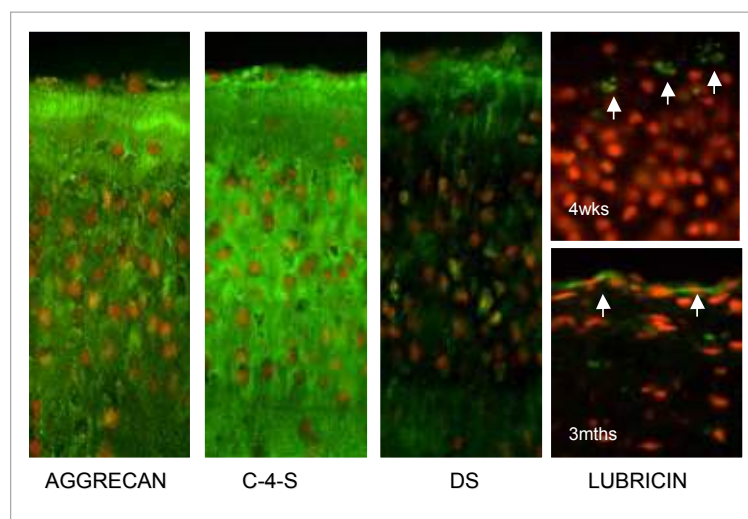
Product	Qty/Size	Application	Catalog Number
Polyclonal Antibody to Cortisol	100 µL	ELISA	2043001
Polyclonal Antibody to Cortisone	100 µL	ELISA	2043002
Polyclonal Antibody to Dapsone	100 µL	ELISA	2043003
Polyclonal Antibody to Dexamethasone	100 µL	ELISA	2043004
Polyclonal Antibody to Digoxin	100 µL	ELISA	2043005
Polyclonal Antibody to Dipyrone	100 µL	ELISA	2043006
Polyclonal Antibody to Etodalac	100 µL	ELISA	2043007
Polyclonal Antibody to Flumethasone	100 µL	ELISA	2043008
Polyclonal Antibody to Flunixin	100 µL	ELISA	2043009
Polyclonal Antibody to Flunixin-COOH	100 µL	ELISA	2043010
Polyclonal Antibody to Kebuzone	100 µL	ELISA	2043011
Polyclonal Antibody to Ketoprofen	100 µL	ELISA	2043012
Polyclonal Antibody to Meloxicam	100 µL	ELISA	2043013
Polyclonal Antibody to Methotrexate	100 µL	ELISA	2043014
Polyclonal Antibody to Methylprednisolone	100 µL	ELISA	2043015
Polyclonal Antibody to Methophenolic Acid	100 µL	ELISA	2043016
Polyclonal Antibody to Oxyphenbutazone	100 µL	ELISA	2043017
Polyclonal Antibody to Phenytoin	100 µL	ELISA	2043018
Polyclonal Antibody to Tolfenamic Acid	100 µL	ELISA	2043019

Abbreviations: Cell Sorting (CS), Immunoblot (IB), Immunofluorescence (IFA), Immunohistochemistry (IHC), Immunoprecipitation (IP), Flow Cytometry (FC)/FACS, Monoclonal Antibody (mAb), Polyclonal Antibody (pAb), Radioimmunoassay (RIA), Western Blot Analysis (WB)

Antibodies to Proteoglycans

Proteoglycans can be categorized depending upon the nature of their glycosaminoglycan chains (chondroitin sulfate, dermatan sulfate, heparan sulfate and keratan sulfate) as well as characterized by size. MD Bioproducts offers antibodies to several categories of proteoglycans:

- Aggrecan is a large aggregating proteoglycan of articular cartilage. It is found also in aorta tissue, discs, tendons and in the perineuronal net.
- Keratocan and Lumican belong to the Small Leucine Rich Proteoglycan (SLRP) family. Keratocan was originally found to be a cornea specific keratan sulphate proteoglycan that, along with Lumican, plays a role in the development and maintenance of corneal transparency. The assembly of collagen type I in tendon is regulated by small leucine-rich proteoglycans (SLRPs).
- Keratan sulfate is a proteoglycan found in the cornea, bone and cartilage, where it acts as a cushion to protect against mechanical shock.
- Lubricin is a glycoprotein present in synovial fluid and on the surface of articular cartilage, where it plays an important role in joint lubrication and synovial homeostasis. Research suggests that the keratan sulfate (KS)-containing SLRPs also play an important role in collagen fibrillogenesis in tendon and articular cartilage.



Extracellular matrix staining with Antibodies to Aggrecan (clone 6B4), Chondroitinase generated C-4-S and DS (clone 2B6) and Lubricin (clone 3A4).

Product	Qty/Size	Application	Catalog Number
Purified rabbit anti-human ADAMTS-5 Polyclonal Antibody	100 µg	WB	2044015
Aggrecan mAb to N-terminal neopeptide ARG (Clone BC3)	100 µg	ELISA, IHC, WB	1042001
Aggrecan mAb to N-terminal neopeptide DIPEN (Clone BC4)	100 µg	ELISA, IHC, WB	1042002
Aggrecan mAb to N-terminal neopeptide NITEGE (Clone BC13)	100 µg	ELISA, IHC, WB	1042003
Aggrecan mAb to N-terminal neopeptide FFGV (Clone BC14)	100 µg	ELISA, IHC, WB	1042004
Monoclonal Antibody to IGD Aggrecan (Clone 6B4)	100 µg	ELISA, IHC, WB	1042005
Monoclonal Antibody to human Aggrecan N-terminal sequence ARGSVIL	100 µL	WB	1028023
Monoclonal Antibody to Cartilage Link Protein (Clone 8A4)	100 µg	IHC, RIA, WB	1042013
Monoclonal Antibody to Chondroitinase generated C-4-S & DS (Clone 2B6)	100 µg	ELISA, IHC, WB	1042009
Monoclonal Antibody to Hyaluronic Binding Region of Aggrecan (Clone 1C6)	100 µg	IHC, WB	1042012
Monoclonal Antibody to Keratocan (Clone Ker-1)	100 µg	ELISA, IHC, WB	1042008
Monoclonal Antibody to Keratan Sulfate (Clone 5D4)	100 µg	ELISA, IHC, WB	1042010
Monoclonal Antibody to Native Bovine Lubricin (Clone 3A4)	100 µg	ELISA, IHC, WB	1042011
Monoclonal Antibody to Lumican (Clone Lum-1)	100 µg	ELISA, IHC, WB	1042007

Abbreviations: Cell Sorting (CS), Immunoblot (IB), Immunofluorescence (IFA), Immunohistochemistry (IHC), Immunoprecipitation (IP), Flow Cytometry (FC)/FACS, Monoclonal Antibody (mAb), Polyclonal Antibody (pAB), Radioimmunoassay (RIA), Western Blot Analysis (WB)

Antibodies to Interleukin Receptors/Th2 Markers

T1/ST2 (also known as IL-1 R4 or IL-33Ra) is a transmembrane glycoprotein expressed on mast cells and Th2 cells. It is a selective marker for both murine and human Th2 lymphocytes and plays a role in regulating inflammatory responses. IL-33 is a recently identified member of the IL-1 family of cytokines and is involved in Th2

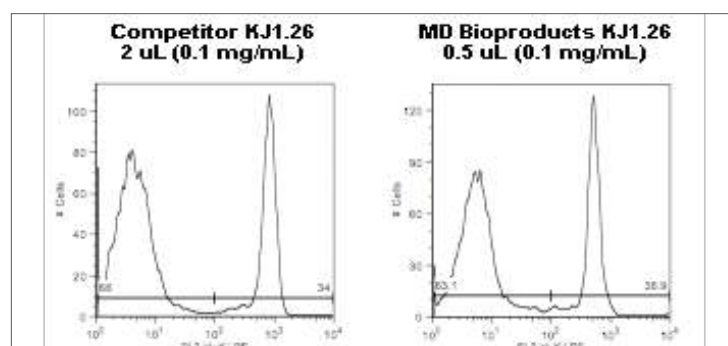
mediated immune responses. IL-33 mediates its biological effects via T1/ST2 binding. The roles of IL-33 and T1/ST2 (IL-33Ra) have been investigated in many immune responses such as Allergy, Asthma, Rheumatoid Arthritis and Osteoarthritis.

Product	Qty/Size	Application	Catalog Number
Monoclonal Antibody to human ST2L (Clone B4E6)	200 μ L	CS, FACS, FC, IHC	101002
Monoclonal Antibody to human ST2L (Clone B4E6), FITC	200 μ L	CS, FACS, FC, IHC	101002F
Monoclonal Antibody to human ST2L (Clone B4E6), Biotinylated	200 μ L	CS, FACS, FC, IHC	101002B
Monoclonal Antibody to mouse T1/ST2 (Clone DJ8)	0.5 mL	FC, IP	101001
Monoclonal Antibody to mouse T1/ST2 (Clone DJ8), Biotinylated	0.5 mL	FC, IP	101001B
Monoclonal Antibody to mouse T1/ST2 (Clone DJ8), FITC	0.5 mL	FC, IP	101001F
Polyclonal Antibody to human Interleukin-18 Receptor (IL-18R)	0.5 mL	CS, FACS, FC, IHC	201006

Antibodies to T cell Receptors

MD Bioproducts mouse monoclonal antibody binds the T-cell receptor (TCR) expressed on DO11.10 murine T cells. The use of DO11.10 and clone KJ1.26 have proven to be instrumental in describing many of the intricate details of cell immunity.

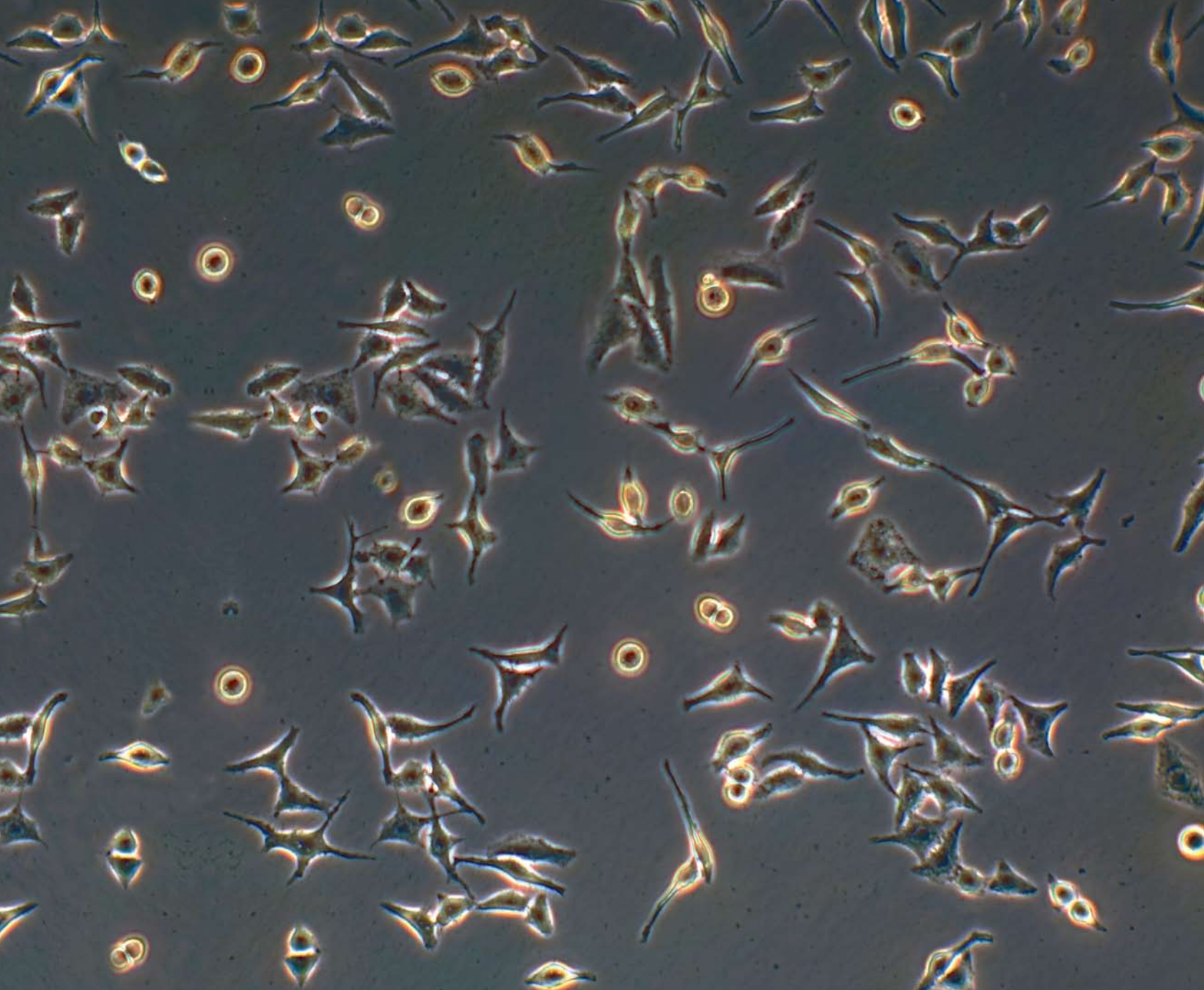
Lymph nodes cells from DO11.10 transgenic mice were incubated with KJ1.26 antibody and stained with a secondary antibody, SAPE. FACS analysis was performed to determine % positive staining. Data indicates that 4 times less antibody is required when using MD Bioproducts KJ1.26 than other commercially available antibodies.



Left: Cells incubated with 2 μ L competitor KJ1.26 antibody contains 34% positive KJ cells. Right: Cells incubated with 0.5 μ L MD Bioproducts KJ1.26 antibody contains 37% positive KJ cells.

Product	Qty/Size	Application	Catalog Number
TCR DO11.10 Monoclonal Antibody (Clone KJ1.26)	200 μ g	FC	1042006
TCR DO11.10 Monoclonal Antibody (Clone KJ1.26), Biotinylated	200 μ g	FC	1042006B
TCR DO11.10 Monoclonal Antibody (Clone KJ1.26), FITC	200 μ g	FC	1042006F

Abbreviations: Cell Sorting (CS), Immunoblot (IB), Immunofluorescence (IFA), Immunohistochemistry (IHC), Immunoprecipitation (IP), Flow Cytometry (FC)/FACS, Monoclonal Antibody (mAb), Polyclonal Antibody (pAb), Radioimmunoassay (RIA), Western Blot Analysis (WB)



6

Cell Culture Related Kits

Cell/Tissue Culture is one of the major tools used in life science research. It is the general term for the removal of cells, tissues or organs from human, animal or plants and the placement into an artificial environment to grow and exhibit a wide range of behaviors, characteristics and shapes. Cell culture provides a good model system for studying interactions between disease-causing agents and cells and the effects of drugs on cells.

Cell Proliferation Kit with XTT Reagent

Cell proliferation assays are widely used in cell biology for the study of growth factors, cytokines and media components, for the screening of cytotoxic agents and for lymphocyte activation. The need for a reliable, sensitive and quantitative assay that would enable analysis of a large number of samples led to the development of methods such as:

- use of radioactive thymidine to label DNA in live cells
- use of BrdU to label DNA in live cells (as a substitute for radioactive thymidine)

The advantages of using this kit can be summarized with the following attributes:

- Easy-to-use: there is no requirement for additional reagents and/or cell washing procedures
- Speed: multi-well plates and an ELISA reader can be used
- Sensitivity: can be assayed even in low cell concentrations
- Accuracy: dye absorbance is proportional to the number of cells in each well
- Safety: there is no need for radioactive isotopes

Product	Qty/Size	Catalog Number
Cell Proliferation Kit with XTT Reagent	1000 assays	409005

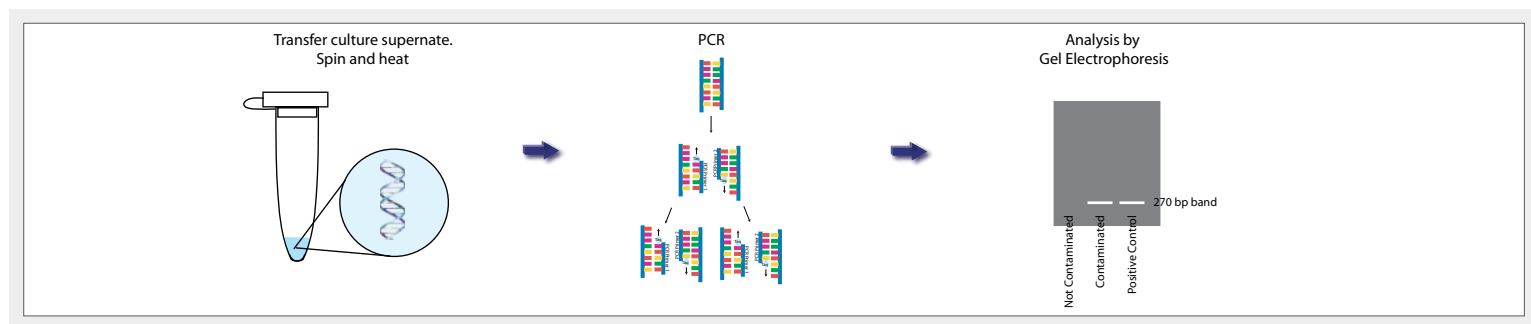
PCR Mycoplasma Test Kit

Cell cultures are used every day as a part of research methods. You rely on these cultures to be healthy, yet up to 35% of them may be contaminated by mycoplasma. Mycoplasma contamination affects many cell functions including metabolism, morphology, protein synthesis and cell proliferation, all of which lead to unreliable results as well as lost time and resources. Since contamination is not typically visible by turbidity, routine screening for mycoplasma contamination is essential. MD Bioproducts provides a rapid and sensitive PCR method for monitoring your cultures.

This kit allows detection of *Acholeplasma* and *Spiroplasma* species and the following *Mycoplasma* species:

- *M. fermentans*
- *M. hyorhinis*
- *M. arginini*
- *M. orale*
- *M. salivarium*
- *M. hominis*
- *M. pulmonis*
- *M. arthritis*
- *M. bovis*
- *M. pneumoniae*
- *M. pirum*
- *M. capricolum*

Product	Qty/Size	Catalog Number
PCR Mycoplasma Test Kit	20 assays	409010





5

Kits for Antibody Applications

Antibodies are used in a wide variety of applications such as western blot, flow cytometry, and immunohistochemistry. The quality of the data from these techniques is dependent largely on the optimization of the antibodies and reagents selected. MD Bioproducts has made optimized kits available to reduce the amount of non-specific binding and high backgrounds that are often associated with these techniques.

Collagen Type II Immunostaining Kit

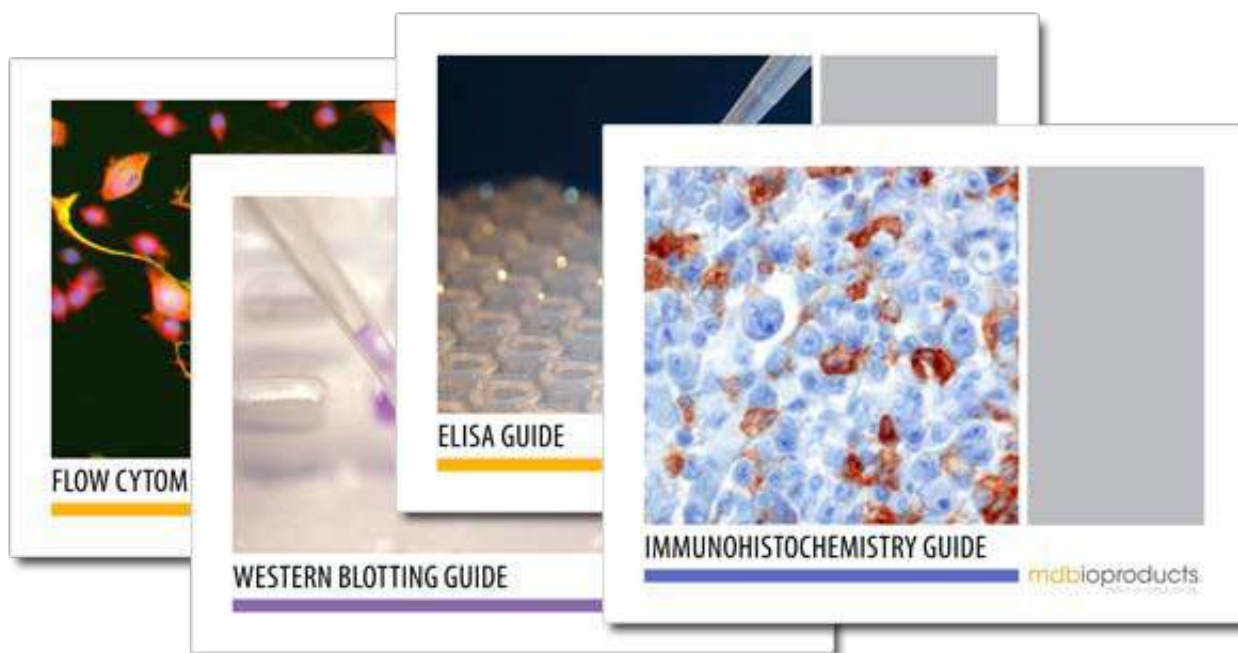
The collagen molecule is a unique structure composed of 3 alpha chains that form a triple helical structure. There are 26 unique types of collagen all with a unique amino acid sequence that causes the structure to be stable, highly resistant to proteolytic degradation, heat, and chemicals. Since the different collagen molecules are similar in structure and amino acid sequence, it is very difficult to

identify them by ordinary chemical or histological evaluations. To aid with collagen type II identification, this staining kit provides a cocktail of monoclonal antibodies for collagen type II. The epitope specificity of this antibody cocktail allows for immunostaining of collagen type II in tissue of all species.

Product	Application	Catalog Number
Collagen Type II Immunostaining Kit	for use on tissues, cells	M036004

Application Guides

Download application guides for common antibody applications. Visit www.mdbioproducts.com



Cover image: Sarcoma cells in culture.
Sarcomas are cancers affecting the
connective tissue, bone, cartilage,
fat and muscle.

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