



List of Validated Biomarkers at ITR

<u>Biomarker</u>	<u>Species</u>	<u>Platform</u>	<u>Matrix</u>
Antibodies			
Anti-KLH IgG/IgM (immunotox, TDAR)	Rat, Cyno	ELISA	Serum
Total IgE	Mouse	ELISA	Serum, Plasma
Total IgG, IgM	Rat, Dog, Cyno	ELISA	Serum
Complement			
Bb fragment	Cyno	ELISA	Plasma
C3a fragment (C3adesArg)	Cyno	ELISA	Plasma
CH50, total complement activity	Rat, Dog, Cyno	ELISA	Serum
C-Reactive Protein (CRP)	Rat, Dog, Cyno, Rabbit, Mouse	ELISA	Serum, Plasma
Terminal Complement Complex (TCC / SC5b-9)	Cyno	ELISA	Serum
Cytokines			
CCL2 (monocyte chemotactic protein 1, MCP-1)	Cyno	ELISA	Serum
CCL2 (monocyte chemotactic protein 1, MCP-1)	Mouse	CBA*	Serum, BALF
CCL3	Mouse	CBA*	Serum, BALF
CXCL1 (KC)	Rat	CBA*	Serum
CXCL2 (CINC-3 / MIP-2)	Rat	ELISA	Serum, BALF
CXCL10 (INF- γ -induced protein 10, IP-10)	Cyno	ELISA	Serum
CXCL12 (SDF-1)	Cyno	ELISA	Serum
GM-CSF	Rat	CBA*	Serum
Interferon alpha (IFN- α)	Cyno	CBA*	Serum
Interferon alpha (IFN- α)	Mouse	ELISA	Serum, BALF
Interferon beta (IFN- β)	Cyno	CBA*	Serum
Interferon gamma (IFN- γ)	Dog	ELISA	Serum
Interferon gamma (IFN- γ)	Cyno, Rat, Mouse	CBA*	Serum
Interleukin 1 alpha (IL-1 α)	Rat	CBA*	BALF
Interleukin 1 beta (IL-1 β)	Mouse, Cyno	CBA*	Serum
Interleukin 2 (IL-2)	Cyno	CBA*	Serum
Interleukin 4 (IL-4)	Cyno	CBA*	Serum
Interleukin 5 (IL-5)	Cyno	CBA*	Serum
Interleukin 6 (IL-6)	Cyno, Mouse	CBA*	Serum, BALF
Interleukin 6 (IL-6)	Rat, Dog, Cyno, Mouse	ELISA	Serum, BALF
Interleukin 8 (IL-8)	Dog, Cyno	ELISA	Serum, BALF
Interleukin 10 (IL-10)	Rat	CBA*	Serum
Interleukin 12 p70 (IL-12p70)	Rat	CBA*	Serum
Interleukin 13 (IL-13)	Mouse	CBA*	Serum
Interleukin 18 (IL-18)	Cyno	ELISA	Serum
Interleukin 33 (IL-33)	Rat	CBA*	Serum
Transforming growth factor beta 1 (TGF- β 1)	Rat	ELISA	Lung extract
Tumor Necrosis Factor (TNF)	Rat, Cyno, Mouse	CBA*	Serum
Tumor Necrosis Factor (TNF)	Dog, Mouse	ELISA	Serum, BALF



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Damage markers			
Alpha-2-Macroglobulin (A2M)	Rat	ELISA	Serum
Apolipoprotein-B (ApoB)	Cyno	ELISA	Plasma
Beta 2 Microglobulin (B2M)	Rat	ELISA	Serum, Urine
Cardiac Troponin I (cTnI)	Rat, Dog, Cyno	ELISA	Serum
Clusterin	Rat	ELISA	Serum, Urine
Cystatin C	Rat	ELISA	Serum, Urine
Kidney injury marker 1 (KIM-1)	Rat	ELISA	Serum, Urine
N-Acetyl-β-(D)-Glucosaminidase (NAG)	Rat	ELISA	Serum, Urine
Neutrophil gelatinase-associated lipocalin (NGAL)	Rat	ELISA	Serum, Urine
Retinol Binding Protein (RBP)	Rat	ELISA	Serum, Urine
Hormones			
Corticosterone	Rat	ELISA	Serum
Cortisol	Dog	ELISA	Serum
C-peptide	Rat	ELISA	Serum
Estradiol (E2)	Cyno	ELISA	serum
Growth hormone (GH)	Rat, Dog, Human	ELISA	Serum
Insulin	Rat, Dog	ELISA	Serum
Insulin-like growth factor 1 (IGF-1)	Rat, Dog, Cyno, Human	ELISA	Serum
Intact Parathyroid hormone (iPTH)	Rat, Cyno	ELISA	Serum, Plasma
Oxytocin	Rat	ELISA	Serum
Prolactin	Rat, Dog	ELISA	Serum
Thyroid-stimulating hormone (TSH)	Rat, Dog	ELISA	Serum
Thyroxine (T4)	Rat, Dog	ELISA	Serum
Triiodothyronine (T3)	Rat, Dog	ELISA	Serum
Other biomarkers			
Albumin	Rat, Mouse	ELISA	Serum, BALF, Urine
Bone-specific Alkaline Phosphatase (BAP)	Cyno	ELISA	Serum
C-terminal telopeptides of Type I collagen (CTX)	Rat, Dog	ELISA	Serum
Haptoglobin	Mouse	ELISA	Serum
Histamine	Minipig	ELISA	Serum
Mast cell tryptase (MCT)	Cyno	ELISA	Serum
Neopterin	Cyno	ELISA	Serum
Osteocalcin	Rat, Dog	ELISA	Serum
Pentraxin 2 (PTX2) / Serum amyloid P component (SAP)	Mouse	ELISA	Serum, Plasma
sCD25 (IL-2Ra)	Cyno	ELISA	Serum, Plasma
Serum amyloid A (SAA)	Dog	ELISA	Serum
sTNF RI (TNFRp55)	Cyno	ELISA	Serum
sTNF RII (TNFRp75)	Cyno	ELISA	Serum
Total protein	Mouse	Colorimetric	BALF



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Functional assays			
NK cell assay	Rat	Flow cytometry	Spleen
Proteasome activity	Cyno	Enzymatic	Whole blood
pSTAT3 in T cells, B cells and Monocytes	Human	Flow cytometry	PBMC
pSTAT5 in T cells	Cyno, Human	Flow cytometry	PBMC
Phenotypes			
Absolute lymphocyte counts (T/B/NK panels)	Rat, Cyno	Flow cytometry	Whole blood
Absolute lymphocyte counts (T-c memory/naïve)	Cyno	Flow cytometry	Whole blood
Monocyte counts (classical/activated)	Cyno	Flow cytometry	Whole blood
Activated T lymphocytes immunophenotyping	Cyno	Flow cytometry	Activated PBMC
Dendritic cells phenotyping (mDC and pDC)	Cyno	Flow cytometry	PBMC
Regulatory T cells (with intracellular Foxp3)	Cyno	Flow cytometry	Whole blood, PBMC
<u>Various surface and intracellular markers to combine:</u>			
- Surface :			
CD3, CD4, CD8, CD11c, CD14, CD16, CD19, CD20, CD21, CD25, CD28, CD38, CD43, CD44, CD45, CD45RA, CD62L, CD69, CD95, CD115, CD122, CD127, CD137, CD138, CD159a (NKG2A), CD161B/c, CD197 (CCR7), CD278 (ICOS) CD314 (NKG2D), HLA-DR, TCR $\gamma\delta$, MHC-II	Cyno, Human, Mouse, Rat, Pig **	Flow cytometry	Whole blood, Splenocytes, Lymph nodes
- Intracellular :			
FoxP3, Granzyme B, Helios, IL-4, IL-6, IL10, IFN- γ , Ki67, Perforin, TGF- β , TNF	Cyno, Human, Mouse, Rat **	Flow cytometry	Whole blood, Splenocytes, Lymph nodes
- Other : Viability, Apoptosis, Proliferation Migration	Various species	Flow cytometry, Microplate (fluorescence)	Various cell types

*CBA: (Flow) Cytometry Bead Array, non-GLP assay combining multiple markers detection per sample.

** The listed markers may not apply to all the species.