



# High-Sensitivity ELISA Kits

## Human, Mouse, and Cynomolgus/Rhesus

For over three decades, PBL Assay Science has supplied high quality research-grade products to the scientific community. Known and trusted as a premier resource for Interferon and Cytokine researchers, PBL offers highly sensitive analyte-specific ELISAs that have earned excellent reputations for providing accurate and consistent results. They are designed to be easily adopted in a regulated environment with:

- High reproducibility & accuracy
- Best-in-class LLOQs
- Robust matrix tolerance (including autoimmune disease sera)

### Featured Kits:

- Human IFN-Alpha
- Human IFN-Beta
- Human IL-22
- Human IL-15
- Mouse IFN-Alpha
- Mouse IFN-Beta
- Cynomolgus/Rhesus IFN-Alpha
- Cynomolgus IFN-Beta

Table 1. Target Market & Research Areas of Interest

Research Area	Keywords
Autoimmune diseases	Systemic Lupus Erythematosus (SLE), Multiple Sclerosis (MS), Rheumatoid Arthritis (RA), Psoriasis, *IL-17 driven immune responses, IL-22, *IFN
Cancer research & Immuno-Oncology	Kaposi Sarcoma, Melanoma, Hairy Cell Leukemia, IL-15, *IFN, Checkpoint inhibitors
Infectious diseases	Virus, *TLR, Cytokine Storm, IFN, IL-15
Inflammatory diseases	Cytokine Storm, TLR, IFN, IL-15, IL-22
Respiratory diseases	TLR, IL-15, IL-22

\*IFN (Interferon) | \*IL (Interleukin) | \*TLR (Toll Like Receptor)



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# Human Interferon Alpha (IFN- $\alpha$ ) ELISAs

Detect and quantitate human IFN-Alpha subtypes in serum, plasma, or Tissue Culture Media (TCM).



## Featured:

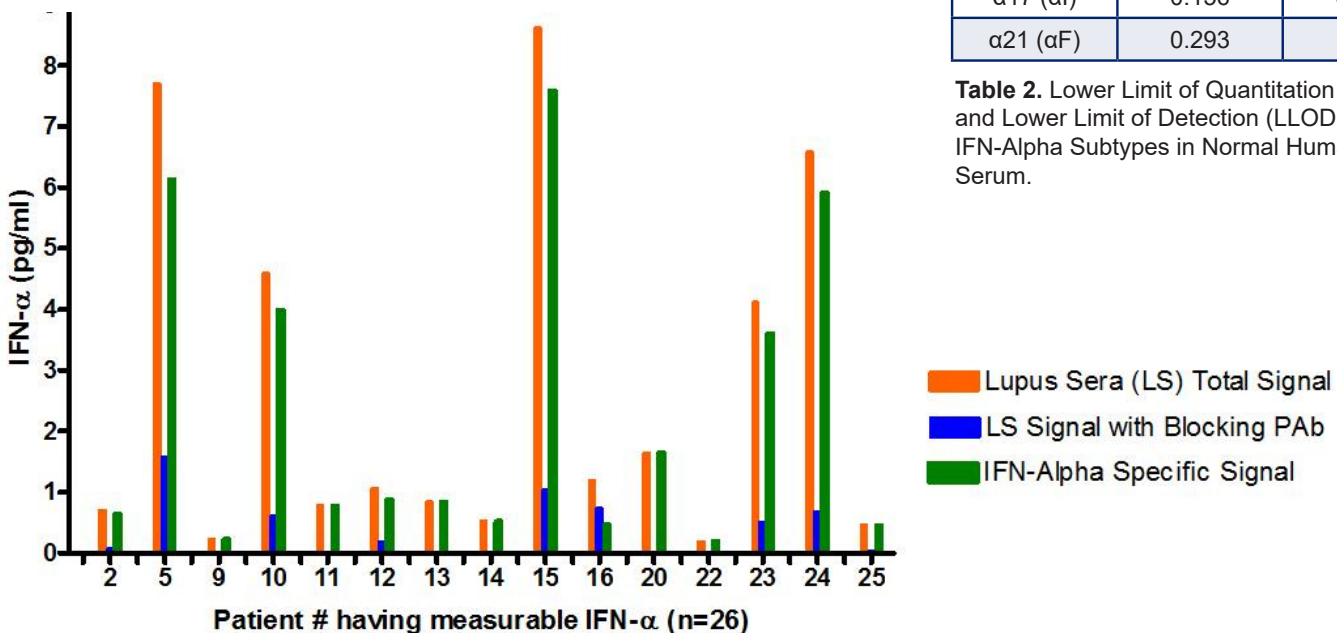
### Human IFN-Alpha All Subtype ELISA (Cat. No. 41115)

#### High Sensitivity

- Assay Standard Range: 1.95 – 125 pg/ml
- Accurate low pg/ml detection of all 12 human IFN-Alpha subtypes
- Robust matrix tolerance including normal & autoimmune disease sera, EDTA plasma, and TCM
- Optimized for autoimmune sera and plasma samples
- Consistent, reproducible results with < 10% inter- and < 8% intra-assay CVs
- Detects previously “missed” IFN-Alpha subtypes

Subtype	LOD (pg/ml)	LOQ (pg/ml)
$\alpha$ 1 ( $\alpha$ D)	0.09	0.343
$\alpha$ 2a ( $\alpha$ A)	0.056	0.214
$\alpha$ 4a ( $\alpha$ M1)	0.099	0.382
$\alpha$ 5 ( $\alpha$ G)	0.083	0.276
$\alpha$ 6 ( $\alpha$ K)	0.041	0.183
$\alpha$ 7 ( $\alpha$ J1)	0.112	0.423
$\alpha$ 8 ( $\alpha$ B2)	0.284	0.993
$\alpha$ 10 ( $\alpha$ C)	0.108	0.447
$\alpha$ 14 ( $\alpha$ H)	0.168	0.585
$\alpha$ 16 ( $\alpha$ WA)	0.078	0.328
$\alpha$ 17 ( $\alpha$ I)	0.156	0.522
$\alpha$ 21 ( $\alpha$ F)	0.293	1.129

**Figure 1.** Global Human IFN-Alpha-Specific Signals in Lupus Patient Sera



**Table 2.** Lower Limit of Quantitation (LLOQ) and Lower Limit of Detection (LLOD) of IFN-Alpha Subtypes in Normal Human Serum.

	41135 (TCM)	41115
High sensitivity for low level Human IFN-Alpha quantification	1.95 - 125 pg/ml	
Human IFN-Alpha all subtype reactivity for total amount measurement	12 of 12	
Robust sample matrix compatibility	TCM	TCM; EDTA Plasma; Healthy & Autoimmune Disease Sera

Cat. No.	Description	Size
41135-1	VeriKine-HS Human IFN-Alpha All Subtype TCM ELISA Kit (TCM)	1 x 96-well plate
41115-1	VeriKine-HS Human IFN-Alpha All Subtype ELISA Kit (S, P, TCM)	1 x 96-well plate

# Human Interferon Beta (IFN-β) ELISAs

Accurately detect and measure human IFN-Beta in serum, plasma, or TCM at an improved level of sensitivity.

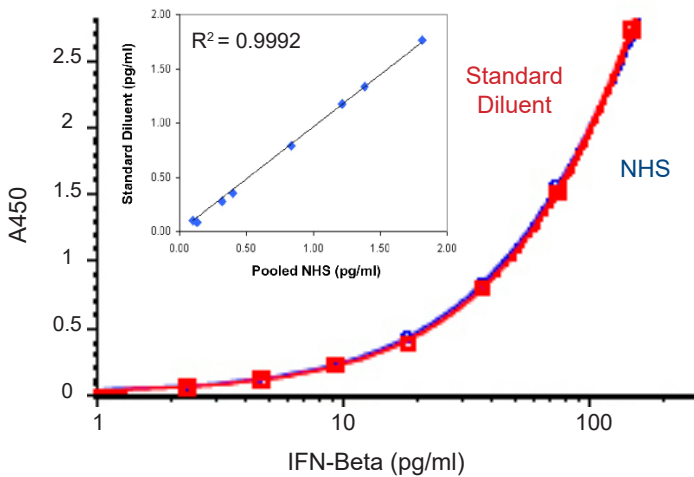


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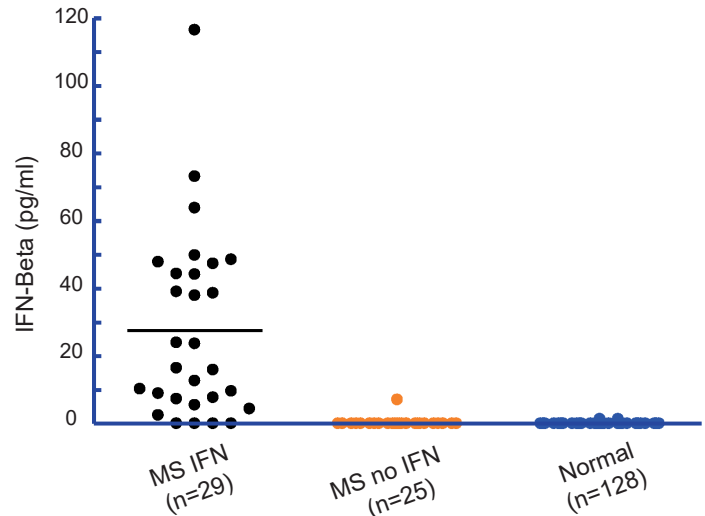
### Human IFN-Beta Serum ELISA (Cat. No. 41415)

#### High Sensitivity

- Assay Standard Range: 1.2 – 150 pg/ml
- Provides > 90% serum spike-recovery
- Reproducible results with < 8% inter- and intra-assay CVs
- Robust matrix tolerance for autoimmune disease sera
- Validated by multiple CROs for sensitive measurement of IFN-Beta therapeutics in human serum samples
  - e.g. Rebif®, Avonex®, Extavia®, Betaseron®
- Suitable for PK, PD, Toxicity & Biomarker studies



**Figure 2. ELISA Standard Curve in Normal Human Serum (NHS) vs. Standard Curve in Standard Diluent.** No observable inhibitory effect of normal human serum.



**Figure 3. Multiple Sclerosis (MS).** IFN-Beta was measured in sera/plasma of Multiple Sclerosis (MS) patients and Normal Donors. IFN-Beta was found to be quantifiable in 86% of MS patients on IFN-Beta therapy, 4.1% of MS patients on other therapies, and 1.5% of Normal Donor samples.

	41435 (TCM)	41415
High sensitivity for Human IFN-Beta quantification	2.34 pg/ml	1.2 pg/ml
Robust sample matrix compatibility	TCM	TCM; Plasma; Healthy & Autoimmune Disease Sera
Interference by sIFNAR2	No	No

Cat. No.	Description	Size
41435-1	VeriKine-HS Human IFN-Beta TCM ELISA Kit (TCM)	1 x 96-well plate
41415-1	VeriKine-HS Human IFN-Beta Serum ELISA Kit (S, P, TCM)	1 x 96-well plate
41410-1, 2	VeriKine Human IFN-Beta ELISA Kit (TCM)	1 x 96-well plate, 5 x 96-well plate

# Human Interleukin 22 (IL-22) ELISA



Detect and quantitate human IL-22 in Serum, Plasma, or TCM.

Interleukin-22 (IL-22) is a member of the IL-10 family of cytokines. Other names include IL-TIF and Zcyto18. IL-22 is produced by a variety of cells including TH1, TH17, TH22 T-cells, NKT cells, ILC3, neutrophils and macrophages. IL-22 targets primarily non-hemopoietic cells such as stromal and epithelial cells. IL-22 has both protective effects, such as hepatocyte and epithelial cell survival, and pro-inflammatory effects. It is also implicated in autoimmune diseases such as Systemic Lupus Erythematosus, Rheumatoid Arthritis and Psoriasis. IL-22 is often considered a hallmark of IL-17 driven immune responses.

## Human IL-22 ELISA (Cat. No. 41701)

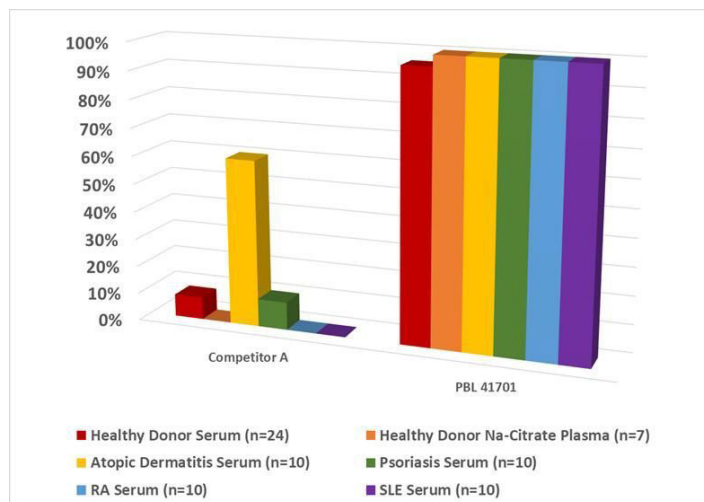
### High Sensitivity

- Sub-picogram LLOQ (assay range 0.78 - 50 pg/ml) provides accurate quantification of Human IL-22 levels in healthy and disease sera samples
- Robust matrix tolerance in serum, plasma and TCM, including different IL-22 related disease sera
- Inter- and intra-assay CVs of < 10% provide consistent and reproducible results

**Table 3.** 41701 exhibits high detectability of endogenous IL-22 in autoimmune / IL-22 related disease sera

Disease Patient Serum	% IL-22 Detectability (n=10 each)	IL-22 Conc Range (pg/ml)	Mean IL-22 Conc (pg/ml)	% CV
Atopic Dermatitis	100%	2.30 - 32.16	14.77	2.14%
Psoriasis	100%	1.25 - 25.99	5.13	3.82%
Rheumatoid Arthritis	100%	1.98 - 9.47	5.58	3.66%
Systemic Lupus Erythematosus	100%	1.55 - 9.22	3.13	4.70%

**Figure 4.** Competitive Comparison for Healthy and Disease Sera Readability between 41701 and Competitor A



Cat. No.	Description	Size
41701-1	VeriKine-HS Human IL-22 ELISA Kit	1 x 96-well plate

# Human Interleukin 15 (IL-15) ELISA



Accurately detect and measure human IL-15 in serum, plasma, or TCM at an improved level of sensitivity.

Interleukin-15 (IL-15) is a member of the IL-2 family of cytokines which also includes IL-4, -7, -9 and -21. It has similar and unique functions compared to IL-2. Signaling by IL-15 can be through the cytokine alone, in complex with soluble IL-15R $\alpha$  and transpresented bound to IL15R $\alpha$ . It is produced largely by monocyctic cells but also by dendritic cells, keratinocytes, fibroblasts, myocytes, and nerve cells. It seems to enhance the expansion of CD8 memory cells, NK and NK-T cells. IL-15 plays a role in tumor biology and autoimmune diseases including Psoriasis, Rheumatoid Arthritis, Inflammatory Bowel Disease, Celiac Disease, Alopecia Areata and Systemic Lupus Erythematosus.

## Human IL-15 ELISA (Cat. No. 41702)

### High Sensitivity

- Sub-picogram LLOQ (assay range 0.51-32.8 pg/ml) provides measurement at or near basal levels of human IL-15 in different sample matrices
- Unique antibodies allow detection of both free and bound forms of IL-15 (IL-15/IL-15R $\alpha$  complex)
- Robust matrix tolerance compatible with serum, plasma, and TCM
- Inter- and intra-assay CVs of < 10% provide consistent and reproducible results

Figure 5. Comparative standard curves of 41702 with competitor IL-15 ELISAs

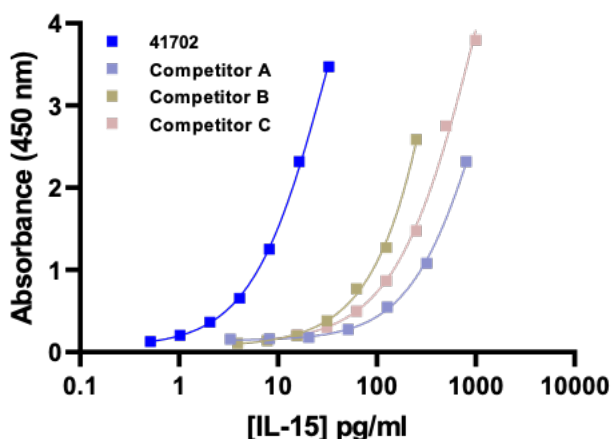
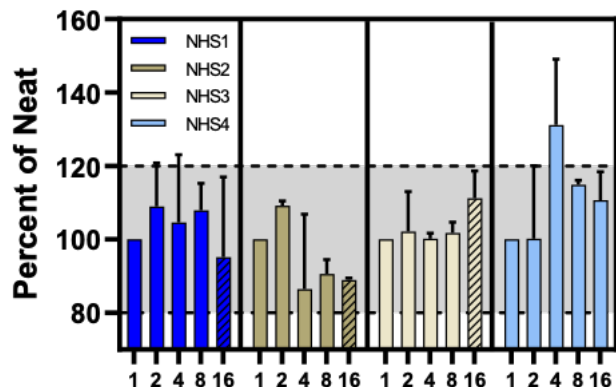


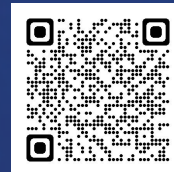
Figure 6. 41702 Assay Parallelism Performance with Healthy Donor Serum



Cat. No.	Description	Size
41702-1	VeriKine-HS Human IL-15 ELISA Kit	1 x 96-well plate

# Mouse Interferon Alpha (IFN- $\alpha$ ) ELISAs

Achieve global detection and quantitation of all mouse IFN-Alpha subtypes in sera, plasma, or TCM.



## Featured:

### Mouse IFN-Alpha All Subtype ELISA (Cat. No. 42115)

#### High Sensitivity

- Assay Standard Range: 2.38 – 152 pg/ml
- Recognizes all 14 IFN-Alpha subtypes
- Sensitive, low pg/ml global detection of mouse IFN-Alpha subtypes
- Robust matrix tolerance including serum, plasma, and TCM
- Rapid ELISA provides total interferon alpha readout in ~ 2 hours
- High data reproducibility with < 10% inter- and < 8% intra-assay CVs

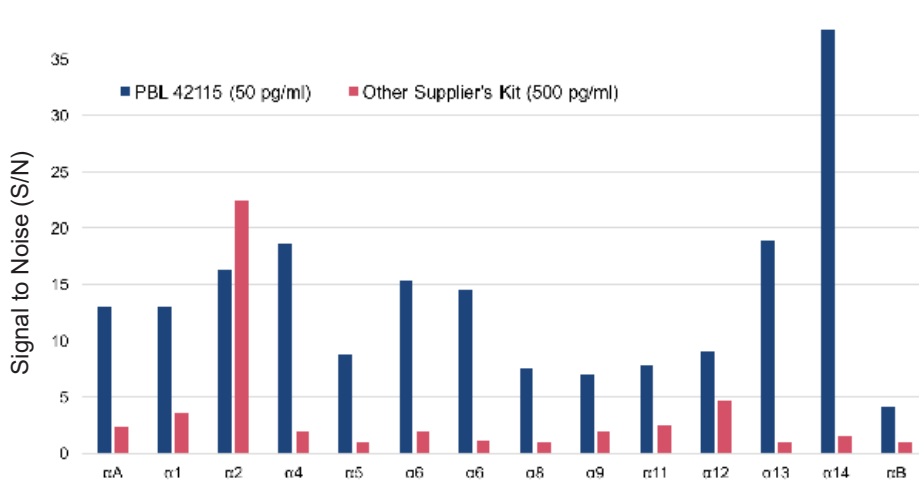


Figure 7. Signal to Noise Ratios of Mouse IFN-Alpha Subtypes in Mouse Serum

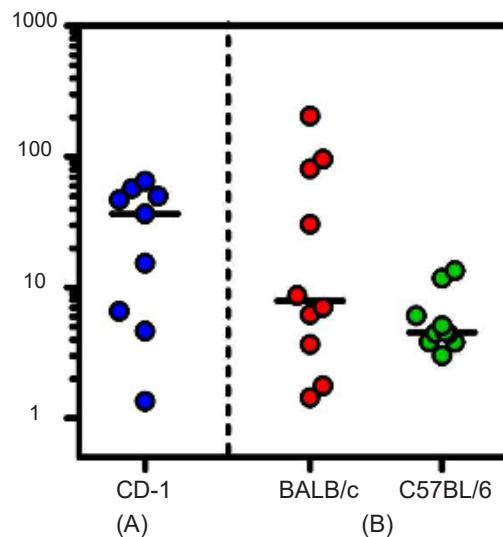


Figure 8. Levels of endogenous mouse IFN-Alpha quantified in pooled plasma (A) and individual sera (B)

	42120	42115
• Good    •• Better    ••• Best	Mu-IFN- $\alpha$	Mu-IFN- $\alpha$ All Subtype
Global IFN-Alpha subtype measurement in serum or plasma	••	•••
Global IFN-Alpha subtype measurement in TCM	••	•••
Reproducible results with < 10% inter- & intra-assay CVs	•••	•••

Cat. No.	Description	Size
42120-1, 2	VeriKine Mouse IFN-Alpha ELISA Kit (TCM)	1 x 96-well plate, 5 x 96-well plate
42115-1	VeriKine-HS Mouse IFN-Alpha All Subtype ELISA Kit (S, P, TCM)	1 x 96-well plate

# Mouse Interferon Beta (IFN-β) ELISAs



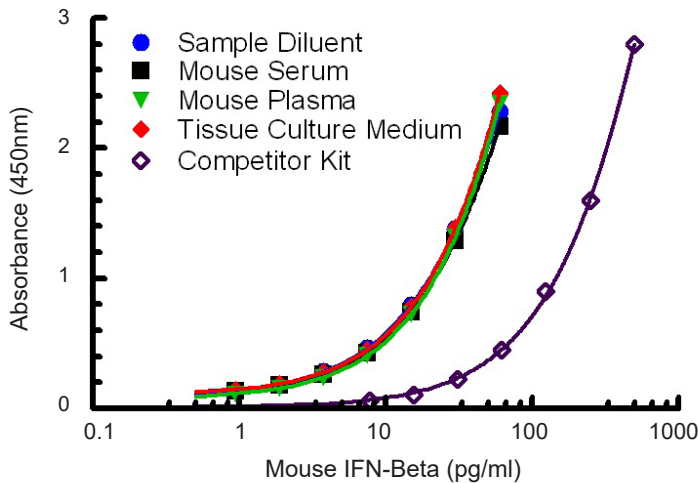
Superior detection and measurement of mouse IFN-Beta in sera, plasma, or TCM at an unrivaled level of sensitivity.

## Featured:

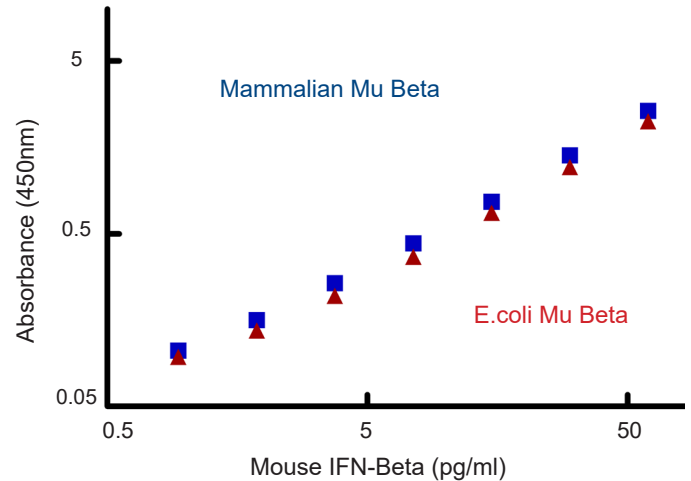
### Mosue IFN-Beta Serum ELISA (Cat. No. 42410)

#### High Sensitivity

- Assay Standard Range: 0.94 – 60 pg/ml
- Accurately quantifies low levels of mouse IFN-Beta in multiple matrices
- Provides > 90% spike-recovery in serum and plasma
- High precision assay reproducibility with ≤ 7% and ≤ 6% intra-assay CVs
- Total assay time of ~ 2 hours



**Figure 9. Representative Standard Curves.** Competitor data obtained from published public source (provided for comparison use only)



**Figure 10. Comparison of ELISA Reactivity of Mammalian and E.coli-expressed Mouse IFN-Beta.** Sensitive detection of mammalian and *E.coli*-expressed IFN-Beta.

	42400	42410
	Mu-IFN-β	Mu-IFN-β Serum
• Good    •• Better    ••• Best		
Accurate IFN-Beta measurement in serum or plasma		•••
Accurate IFN-Beta measurement in TCM	••	•••
Reproducible results with < 10% inter- & intra-assay CVs	••	•••

Cat. No.	Description	Size
42400-1, 2	VeriKine Mouse IFN-Beta ELISA Kit (TCM)	1 x 96-well plate, 5 x 96-well plate
42410-1, 2	VeriKine-HS Mouse IFN-Beta Serum ELISA Kit (S, P, TCM)	1 x 96-well plate, 5 x 96-well plate

# Cynomolgus/Rhesus Interferon Alpha (IFN- $\alpha$ ) ELISA



Quantifies Cynomolgus and Rhesus IFN-Alpha 2 in serum, plasma, and TCM.

Cynomolgus/Rhesus are considered a preferred model for the study of human diseases due to a close phylogenetic relationship to humans. The model is crucial to the elucidation of pathological mechanisms and may enable the development of novel diagnostic and therapeutic tools. Studies of innate and adaptive immunity, pharmacodynamics (PD), and immunotoxicology of interferon stimulating/inhibiting molecules, as well as Emerging Infectious Disease (EID) models, can all be further advanced with an interferon immunoassay that is designed specifically for Non-Human Primates (NHP).

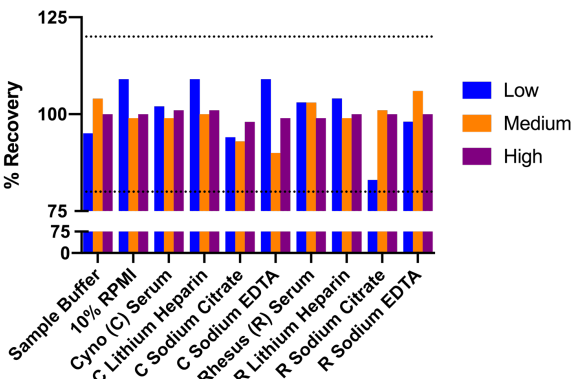
**Featured:**

**Cynomolgus/Rhesus IFN-Alpha ELISA (Cat. No. 46100)**

**High Sensitivity**

- Assay Range: 25 - 1600 pg/ml
- Specificity: Cynomolgus (*Macaca fascicularis*) and Rhesus (*Macaca mulatta*) Interferon Alpha 2
- High data reproducibility with < 10% inter- and intra-assay CVs
- Provides greater NHP IFN-Alpha detection sensitivity and matrix compatibility than traditional Human IFN-Alpha ELISAs
- One of the few Cynomolgus/Rhesus IFN-Alpha ELISAs on the market

**Figure 11.** Spike Recovery of Cynomolgus/Rhesus IFN-Alpha in Various Metrics



**Table 4.** Spike Recovery of Cynomolgus/Rhesus Interferon Alpha in Cynomolgus/Rhesus Serum

	Concentration (pg/ml)	% Recovery Range	Average % Recovery
Low Spike	40	75-115%	93%
Med Spike	240	88-119%	109%
High Spike	1440	94-121%	104%

Cat. No.	Description	Size
46100-1	Cynomolgus/Rhesus IFN-Alpha ELISA Kit (S, P, TCM)	1 x 96-well plate well plate

# Cynomolgus Interferon Beta (IFN- $\beta$ ) ELISA

Quantifies Cynomolgus IFN-Beta in serum, plasma, and TCM.

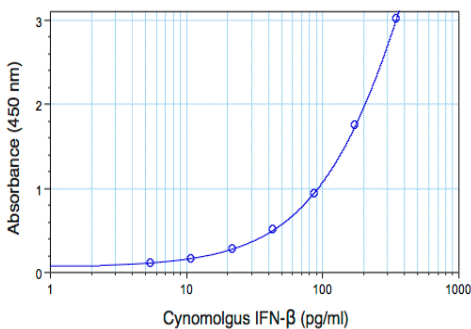
**Featured:**

**Cynomolgus IFN-Beta ELISA (Cat. No. 46415)**

**High Sensitivity**

- Assay Range: 5.47 - 350 pg/ml
- Specificity: Cynomolgus (*Macaca fascicularis*) Interferon Beta
- High data reproducibility with < 10% inter- and intra-assay CVs
- Provides greater NHP IFN-Beta detection sensitivity and matrix compatibility than traditional Human IFN-Beta ELISAs
- One of the few Cynomolgus IFN-Beta ELISAs on the market

**Figure 12.** Typical Cynomolgus IFN-Beta Standard Curve from 5.47 to 350 pg/ml



**Table 5.** Performance specifications at three different concentrations

	Low	Medium	High
Intra-Assay CV	2.5%	1.6%	2.8%
Inter-Assay CV Operator 1	5.4%	4.3%	2.3%
Inter-Assay CV Operator 2	4.4%	3.4%	5/8%

Cat. No.	Description	Size
46415-1	Cynomolgus IFN-Beta ELISA Kit (S, P, TCM)	1 x 96-well plate well plate