Endocrinology and Neuroscience

Highly sensitive assays for the quantitative detection of hormones and neurotransmitters in a variety of species and sample types.

Stressed about research? Trust our Assays!

- **RIA, EIA & ChLIA Kits for Research**
- **Ultra-low Concentration Detection of Endocrine Hormones and Biogenic Amines**
- **Variety of Animal and Human-derived Sample Types**
  From Alligator to Zebra,
  Serum to Whale Blow!

MGP

MP

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Studying Stress?

Trust the Gold Standard in Corticosterone measurement for your research

- Proven performance and reliability for over 30 years
- Over 2,500 scientific publications
- Adaptable to many species and sample types
- Highly sensitive

MP Bio Corticosterone RIA Kit *(see page 12)*

Other Stress Research Immunoassays *(see page 11)***:**

ACTH • Cortisol • Dopamine • Epinephrine • Growth Hormone • Norepinephrine • Prolactin

MP Biomedicals Overview

MP Biomedicals is a collaborative partner who delivers essential components for life sciences and diagnostic teams dedicated to the development of quality life enhancements and well-being. We partner with our customers and the wider scientific community to advance the science of medical diagnostics and life science research. Quality products, innovative technology and expert knowledge all play an essential role in the scientific pursuit for answers.

No matter how dynamic the evolution of the diagnostic, life science and biotechnology markets, MP Biomedicals aims to remain a premier partner at the forefront of discovery in an ever-changing industry. For more than 40 years, MP Biomedicals has been recognized as a leading provider of reliable diagnostic kits and reagents worldwide. We specialize in providing high-performing assays on a variety of platforms including **Immunoblot, Rapid Test, ELISA, EIA, RIA, Chemiluminescence Immunoassay (ChLIA) and Molecular Diagnostics.** Our assays provide diagnostic solutions to clinical laboratories, scientific researchers and veterinary science professionals in the following areas:

- Endocrinology
- Neuroscience Research
- Animal Science
- Veterinary Diagnostics
- Infectious Disease
- Blood Donor Screening
- Drugs of Abuse
- Newborn Screening
- Autoimmune
- Cardiac Markers
- Biogenic Amines
- Tumor Markers
- Anemia

MP Bio is proud to offer many assays which are recognized worldwide as the gold standard, including our Corticosterone RIA for measuring stress levels in a variety of species. Our HTLV Blot 2.4 is the first and only FDA approved confirmation test in the world. We are a global leader in HEV testing as our researchers were the first to identify and clone the Hepatitis E virus. We offer a variety of high quality Immunoblots, Rapid Tests and ELISA assays for many Infectious Diseases, such as:

- Dengue
- Helicobacter pylori
- Hepatitis (A, B, C and E)
- HIV
- HTLV
- Tuberculosis
- Syphilis
- Malaria
- Toxoplasmosis
- Typhoid

MP Bio has been a leading manufacturer of Radioimmunoassay kits since the beginning. We provide the highest quality Immunoassay kits for Endocrinology and Neuroscience research for use with human and animal models. Our assays have been cited in thousands of peer-reviewed publications, showcasing their high performance and reliability. We offer RIA, EIA and ChLIA detection kits for a wide range of analytes:

- 17 α-OH-Progesterone
- 17 β-Estradiol
- 5-HIAA
- ACTH
- Adrenaline (Epinephrine)
- B12/Folate
- Corticosterone
- Cortisol
- C-Peptide
- DHEA / DHEA-S
- Estradiol
- Estrogens (E1 and E2)
- Ferritin
- FSH
- Gastrin
- Glucagon
- hCG
- Insulin
- Luteinizing Hormone
- Melatonin
- Metanephrine
- Noradrenaline (Norepinephrine)
- Normetanephrine
- Progesterone
- Serotonin
- T3 & T4 (Total/Free)
- Testosterone
- TSH

It is our mission to provide reliable, high quality products to ensure accurate results for your lab. We continue to expand our portfolio by offering innovative products in areas such as Chemiluminescence and Molecular Diagnostics. Our Worldwide Technical Service Department is available to provide expert advice and answers when you have questions or need additional information. Highly trained team members are experienced in all aspects of diagnostic applications and will help you find solutions quickly and efficiently.

With ISO-certified and FDA-approved manufacturing and distribution facilities throughout the globe, we are committed to providing high quality diagnostic tests that help advance scientific discovery, improve health and manage diseases. Our diagnostic assays are registered in many countries and either comply with local regulations or are indicated for Research Use Only.

We deliver the tests you need and the results you can trust.

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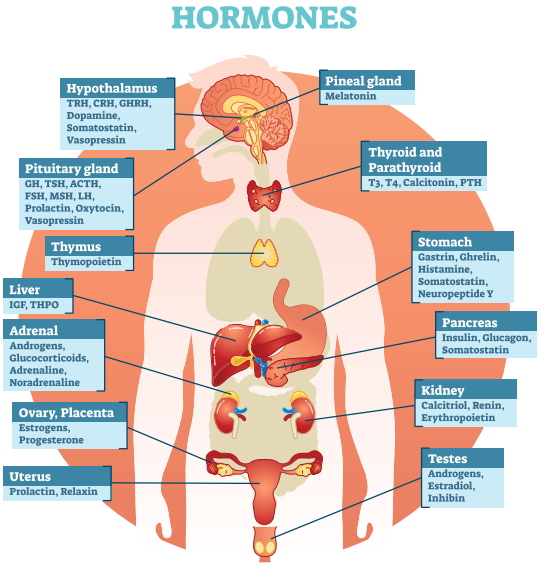
The Endocrine System and Hormones

The endocrine system utilizes hormones to send chemical signals throughout the body to regulate processes such as growth, metabolism, emotion and sexual development. Hormones are chemical messengers that are released into the bloodstream in response to a stimuli and transfer information to various organs to illicit a biological response. The major glands involved in this process are hypothalamus, pituitary, thyroid, parathyroid, thymus, adrenals, gonads (ovaries and testes) and the pancreas. Hormones generally have a releasing, stimulating or inhibiting function and are often part of a regulatory hormonal cascade which eventually provides a feedback signal (negative or positive) to the hypothalamus and pituitary gland to control production and release of additional hormones.

- **Steroid hormones:** Cortisol, Corticosterone, Aldosterone, Testosterone, Estradiol, Estrone, Estriol, Progesterone, Androstenedione
- **Amino acid derivative hormones:** Thyronines (T3, T4), Epinephrine, Norepinephrine, Melatonin
- **Peptide/Protein hormones:** Insulin, ACTH, TSH, LH, FSH, Prolactin, Glucagon, Growth Hormone

Endocrinology research today continues to advance our knowledge of how these hormones work to regulate bodily and cellular functions, as well as how their mis-regulation can lead to a variety of disorders. All over the world researchers are focused on learning more about topics in this field including growth, metabolism, reproduction and neuroendocrinology. Many researchers are focused on studying related disorders such as hypothyroidism, hyperthyroidism, congenital adrenal hyperplasia, Cushing's disease, adrenal insufficiency, endocrine neoplasia, as well as metabolic disorders such as diabetes, obesity, hypoglycemia, cystic fibrosis and phenylketonuria.



Endocrine Gland	Hormone	Primary Hormone Function
Hypothalamus	Corticotropin-releasing hormone (CRH)	Stimulates the pituitary to release adrenocorticotropic hormone (ACTH)
	Gonadotropin-releasing hormone (GnRH)	Stimulates the pituitary to release luteinizing hormone (LH) and follicle-stimulating hormone (FSH)
	Thyrotropin-releasing hormone (TRH)	Stimulates the pituitary to release thyroid-stimulating hormone (TSH)
	Growth hormone-releasing hormone (GHRH)	Stimulates the release of growth hormone (GH) from the pituitary
	Somatostatin	Inhibits the release of GH from the pituitary
	Dopamine	Inhibits the release of prolactin from the pituitary
Anterior pituitary gland	ACTH	Stimulates the release of hormones from the adrenal cortex
	LH	In women, stimulates the production of sex hormones (i.e., estrogens) in the ovaries as well as during ovulation; in men, stimulates testosterone production in the testes
	FSH	In women, stimulates follicle development; in men, stimulates sperm production
	TSH	Stimulates the release of thyroid hormone
	GH	Promotes the body's growth and development
	Prolactin	Controls milk production (i.e., lactation)
Posterior pituitary gland[1]	Vasopressin	Helps control the body's water and electrolyte levels
	Oxytocin	Promotes uterine contraction during labor and activates milk ejection in nursing women
Adrenal cortex	Cortisol	Helps control carbohydrate, protein, and lipid metabolism; protects against stress
	Aldosterone	Helps control the body's water and electrolyte regulation
Testes	Testosterone	Stimulates development of the male reproductive organs, sperm production, and protein anabolism
Ovaries	Estrogen (produced by the follicle)	Stimulates development of the female reproductive organs
	Progesterone (produced by the corpus luteum)	Prepares uterus for pregnancy and mammary glands for lactation
Thyroid gland	Thyroid hormone (i.e., thyroxine [T4] and triiodothyronine [T3])	Controls metabolic processes in all cells
	Calcitonin	Helps control calcium metabolism (i.e., lowers calcium levels in the blood)
Parathyroid gland	Parathyroid hormone (PTH)	Helps control calcium metabolism (i.e., increases calcium levels in the blood)
Pancreas	Insulin	Helps control carbohydrate metabolism (i.e., lowers blood sugar levels)
	Glucagon	Helps control carbohydrate metabolism (i.e., increases blood sugar levels)

[1]These hormones are produced in the hypothalamus but stored in and released from the posterior pituitary gland.

https://pubs.niaaa.nih.gov/publications/arh22-3/153.pdf?ref=driverlayer.com/web

MP Bio Immunoassays for Research in Endocrinology

MP Bio offers hormone detection kits that allow you to carry out the critical research that is so important to advancing our knowledge of how hormones function, which can lead to the discovery of treatments for disorders many people are suffering from today. Our highly sensitive Immunoassays for detecting hormone levels have been utilized in research for over 30 years by researchers all over the world, showing just how reliable our tests are at helping you to collect the information you need. Our hormone detection kits are offered in multiple technology formats, including Radioimmunoassays (RIA), Enzyme Immunoassays (EIA) and our newly added Chemiluminescence Immunoassays (ChLIA). Simply rely on what works.

Analyte	Assay Type	Sample Type	Tests	Cat. No.	Sample Vol.	Sensitivity	Species*
17α-hydroxyprogesterone	RIA (CT)	Serum or Plasma	100	07271102	25 µL	Inquire	Human
	RIA (DA)		100	07171102		0.08 ng/mL	
	ChLIA		96	07M5275A		0.040 ng/mL	
ACTH	RIA (DA)	Plasma	50	07106101	100 µL	5.7 pg/mL	Human
			100	07106102			
Androstenedione	RIA (DA)	Serum or Plasma	100	07109202	300 µL	Inquire	Human
Corticosterone	EIA / ELISA	Serum or Plasma	96	07DE9922	10 µL	4.1 ng/mL	Rat, Mouse
	RIA (DA)		100	07120102		Inquire	
			200	07120103			
Cortisol	RIA (CT)	Serum, Plasma or Urine	100	06B256440	25 µL	0.07 µg/dL	Human
		Serum or Plasma	100	07221102		0.17 µg/dL	
			500	07221105			
			1000	07221106			
	EIA / ELISA	Saliva	96	07P631		0.0519 ng/mL	
		Serum	96	07M21602		91.5 pg	
	ChLIA	Serum or Plasma	96	07M3675A		0.27 µg/dL	
c-Peptide	IRMA	Serum	100	07RK84CT	50 µL	0.105 ng/mL	Human
	EIA / ELISA		96	07M61102		0.02 ng/mL	
	ChLIA		96	07M2775A		0.025 ng/mL	
Dehydroepiandrosterone (DHEA)	EIA / ELISA	Saliva	96	07P626	50 µL	1.163 pg/mL	Human
		Serum or Plasma	96	07M7425A	25 µL	0.10 ng/mL	
	ChLIA		96	07M7475A	25 µL	0.15 ng/mL	
Dehydroepiandrosterone Sulfate (DHEA-S)	RIA (CT)	Serum or Plasma	100	07230102	25 µL	9 ng/mL	Human
	EIA / ELISA	Blood, Serum or Plasma	96	07M5125A	10 µL	0.042 µg/mL	
		Saliva	96	07P625	50 µL	0.068 ng/mL	
	ChLIA	Serum or Plasma	96	07M5175A	10 µL	0.025 µg/mL	
E2 (17B-Estradiol)	EIA / ELISA	Saliva	96	07P634	75 µL	0.5239 pg/mL	Human
		Serum or Plasma		07BC1111	25 µL	10 pg/mL	
	RIA (CT)		100	07238102	100 µL	Inquire	
	RIA (DA)		100	07138102	50 µL		
	ChLIA		96	07M4975A	25 µL	6.5 pg/mL	
E3 (Estriol), unconjugated	EIA / ELISA	Saliva	96	07P633	50 µL	0.860 pg/mL	Human
Follicle Stimulating Hormone (FSH)	RIA	Plasma, Tissue or Cell Culture	120	07RK550	100 µL	0.09 ng/tube	Rat
	EIA / ELISA	Serum	96	07BC1029	50 µL	1.5mIU/mL	Human
	ChLIA	Serum	96	07M475A	50 µL	0.8 mIU/mL	Human
Gastrin	RIA (DA)	Serum	100	06B255017	200 µL	3.3 pg/mL	Human
			200	06B255025			
Glucagon	RIA (DA)	Plasma	50	07152101	20 µL	Inquire	Human
Growth Hormone (GH)	RIA	Plasma, Tissue or Cell Culture	120	07RK551	100 µL	0.16 ng/tube	Rat
	IRMA	Serum	100	07RK5CT	50 µL	0.04 µIU/mL	Human
	EIA / ELISA		96	07BC1033		0.5 ng/mL	
	ChLIA		96	07M1775A		0.118 µIU/mL	

**Other species have been cited in scientific publications.*
All kits are available for research use. Some kits may be cleared for IVD use. Contact us for more information.
CT = coated tube DA = double antibody

> *"Overall, the MP Biomedicals ImmuChem Double Antibody Progesterone and Corticosterone 125I RIA Kits are very reliable and easy to use methods of quantification of the respective steroids."*
>
> - Todd O'Buckley, Research Technician/Lab Manager, Bowles Center for Alcohol Studies, UNC, Chapel Hill

MP Bio Immunoassays for Research in Endocrinology

Analyte	Assay Type	Sample Type	Tests	Cat. No.	Sample Vol.	Sensitivity	Species*
hCG	EIA / ELISA	Serum	96	07BC1027	50 µL	2.0 mIU/mL	Human
		Urine or Serum (qualitative)	96	07BC1045		20 mIU/mL	
	ChLIA	Serum	96	07M875A	25 µL	0.016 mIU/mL	
Insulin	EIA / ELISA	Serum	96	07M60102	50 µL	0.75 µIU/mL	Human
	IRMA		100	07RK400CT	100 µL	0.6 µIU/mL	
	ChLIA		96	07M2475A	50 µL	0.114 µIU/mL	
Luteinizing Hormone (LH)	RIA	Plasma, Tissue or Cell Culture	120	07RK552	100 µL	0.09 ng/tube	Rat
	EIA / ELISA	Serum	96	07BC1031	50 µL	1.0 mIU/mL	Human
	ChLIA	Serum	96	07M675A	50 µL	0.8 mIU/mL	Human
Progesterone	RIA (CT)	Serum or Plasma	100	07270102	100 µL	Inquire	Human
	RIA (DA)		100	07170102			
	EIA / ELISA	Saliva	96	07P637	50 µL	1.477 pg/mL	
		Serum or Plasma	96	07BC1113	25 µL	0.3 ng/mL	
			96	07DE9988		0.04 ng/mL	Rat, Mouse
	ChLIA		96	07M4875A		0.105 ng/mL	Human
Prolactin	RIA	Plasma, Tissue or Cell Culture	120	07RK553	100 µL	0.07 ng/tube	Rat
	EIA / ELISA	Serum	96	07BC1037	50 µL	2.0 ng/mL	Human
			96	07DE9944	25 µL	0.4 ng/mL	Canine
			96	07DE9966		0.6 ng/mL	Rat
	IRMA		100	07RK780CT	100 µL	0.04 ng/mL	Human
	ChLIA		96	07M775A	25 µL	0.8 ng/mL	
T3 (Free)	ChLIA	Serum	96	07M1375A	50 µL	0.03 ng/dL	Human
	RIA (CT)	Serum or Plasma	100	06B258709	100 µL	0.06 pg/mL	
	EIA / ELISA	Serum	96	07BC1006	50 µL	0.05 pg/mL	
T3 (Total)	EIA / ELISA	Serum	96	07BC1005	50 µL	0.2ng/mL	Human
	ChLIA	Serum or Plasma	96	07M175A	50 µL	0.126 ng/mL	
	RIA	Serum	100	06B254215	100 µL	6.7 ng/dL	
T3 Uptake	RIA	Serum	100	06B237116	25 µL	Inquire	Human
	ChLIA	Serum or Plasma	96	07M575A			
T4 (Free)	ChLIA	Serum	96	07M1275A	50 µL	0.03 ng/dL	Human
			192	07M1275B			
	RIA (CT)	Serum or Plasma	100	06B257214		0.045 ng/dL	
			500	06B257215			
	EIA / ELISA	Serum	96	07BC1008		0.05 ng/dL	
T4 (Total)	EIA / ELISA	Serum	96	07BC1007	25 µL	0.5 µg/dL	Human
	ChLIA	Serum or Plasma	96	07M275A	25 µL	0.1 µg/dL	
	RIA		100	06B254011		0.76 µg/dL	
			500	06B254030			
Testosterone	EIA / ELISA	Saliva	96	07P635	25 µL	2.1 pg/mL	Human
		Serum		07BC1115	10 µL	0.05 ng/mL	
		Serum or Plasma		07DE9911	10 µL	0.066 ng/mL	Rat, Mouse
	RIA (DA)		100	07189102	50 µL	Inquire	Human
			500	07189105			
	ChLIA		96	07M3775A	10 µL	0.026 ng/mL	
Thyroid Stimulating Hormone (TSH)	IRMA (CT)	Serum or Plasma	100	07294102	200 µL	0.04 µIU/mL	Human
	RIA	Plasma, Tissue or Cell Culture	120	07RK554	100 µL	0.05 ng/tube	Rat
	EIA / ELISA	Serum	96	07BC1001	100 µL	0.7 mIU/mL	Human
		Serum or Plasma	96	07DE9955	100 µL	0.01 ng/mL	Canine
		Serum	96	07DE9977	25 µL	0.1 ng/mL	Rat
	ChLIA	Serum	96	07M375A	50 µL	1 hr incubation: 0.078 µIU/mL 2 hr incubation: 0.027 µIU/mL	Human
			192	07M375B			

**Other species have been cited in scientific publications.*
All kits are available for research use. Some kits may be cleared for IVD use. Contact us for more information.
CT = coated tube DA = double antibody

Thousands of Publications using MP Bio Hormone Immunoassays

Serum concentrations of cortisol, progesterone and 17 α-OH-progesterone were measured by radioimmunoassay using commercial kits (MP Biomedicals LLC, NY, USA).

Müller, V.; Curcio, B. R.; Toribio, R. E.; Feijó, L. S.; Borba, L. A.; Canisso, I. F.; Nogueira, C. E. W. Cortisol, progesterone, 17αOHprogesterone, and pregnenolone in foals born from mare's hormone-treated for experimentally induced ascending placentitis. *Theriogenology*. **2019**, 123, 139-144.

Serum cortisol and aldosterone concentrations were assayed in duplicate using I^{125} radioimmunoassays (MP Biomedicals, USA). *The mean intra-assay coefficients of variation (CV%) for the duplicates were 1.6% and 2.5% for cortisol and aldosterone, respectively. The assay platform for both hormones was validated by demonstrating parallelism of diluted samples to the standard curve and spike recovery of standard additions of >97%.*

Khudyakov, J. I.; Champagne, C.D.; Meneghetti, L. M.; Crocker, D. E. Blubber transcriptome response to acute stress axis activation involves transient changes in adipogenesis and lipolysis in a fasting-adapted marine mammal. *Scientific Reports*. **2017**, *7*, 42110.

MPB 125I radioimmunoassay kit (17ß-estradiol (E2) Double Antibody - 125I RIA Kit, MP Biomedicals, Solon, OH, USA). Of the RIA kits from DPC, DSL and MPB tested, ***MPB rendered the highest concentrations of 17 ß-estradiol*** *and DSL the lowest.*

Ström, J. O.; Theodorsson, A.; Theodorsson, E. Substantial discrepancies in 17 β-estradiol concentrations obtained with three different commercial direct radioimmunoassay kits in rat sera. *Scandinavian Journal of Clinical and Laboratory Investigation*. **2008**, 68, 8, 806-813.

We suggest that non-invasively collected urates and feathers hold promise for assessing condor responses to acute and chronic environmental and human-induced stressors and ***the MP Biomedicals 125I CORT RIA kit is appropriate for comparing hormones across sample types in the California condor.***

Glucs, Z. E.; Smith, D. R.; Tubbs, C. W.; Jones Scherbinski, J.; Welch, A.; Burnett, J.; et al. Glucocorticoid measurement in plasma, urates, and feathers from California condors (*Gymnogyps californianus*) in response to a human-induced stressor. *PLoS ONE*. **2018**, 13, 10.

Radioimmunoassay was used to quantify triiodothyronine concentrations (#06B-254215; MP Biomedicals, Solon, OH, USA)... *These commercially available assay kits were selected based on previous successful use with respiratory vapour collected from free-swimming whales (see Hunt et al., 2014a).*

Burgess, E. A.; Hunt, K. E.; Kraus, S. D.; Rolland, R. M. Get the most out of blow hormones: validation of sampling materials, field storage and extraction techniques for whale respiratory vapour samples. *Conserv Physiol*. **2016**, 4, 1.

Endocrine Research References

ACTH – Mice

Zhang, R.; Asai, M.; Mahoney, C. E.; Joachim, M.; Shen, Y.; Gunner, G.; Majzoub, J. A. Loss of hypothalamic corticotropin-releasing hormone markedly reduces anxiety behaviors in mice. *Molecular Psychiatry*. **2016**, 22, 5, 733-744.

ACTH – Rat

Snyder, B.; Duong, P.; Tenkorang, M.; Wilson, E. N.; Cunningham, R. L. Rat Strain and Housing Conditions Alter Oxidative Stress and Hormone Responses to Chronic Intermittent Hypoxia. *Front Physiol*. **2018**, 9, 1554.

Aldosterone – Elephant Seal

Khudyakov, J. I.; Champagne, C.D.; Meneghetti, L. M.; Crocker, D. E. Blubber transcriptome response to acute stress axis activation involves transient changes in adipogenesis and lipolysis in a fasting-adapted marine mammal. *Scientific Reports*. **2017**, *7*, 42110.

Cortisol – Fish

Vargas, R.; Balasch, J. C.; Brandts, I.; Reyes-López, F.; Tort, L.; Teles, M. Variations in the immune and metabolic response of proactive and reactive *Sparus aurata* under stimulation with *Vibrio anguillarum* vaccine. *Sci Rep*. **2018**, 8, 1, 17352.

Cortisol – Sheep

Kearton, T.; Marini, D.; Cowley, F.; Belson, S.; Lee, C. The Effect of Virtual Fencing Stimuli on Stress Responses and Behavior in Sheep. *Animals : an open access journal from MDPI*. **2019**, 9, 1, 30.

Estradiol – Rat

Barha C. K.; Brummelte S.; Lieblich S. E.; Galea L. A. M. Chronic restraint stress in adolescence differentially influences hypothalamic-pituitary-adrenal axis function and adult hippocampal neurogenesis in male and female rats. *Hippocampus*. **2011**, 21, 1216–27.

Estrogen – Baboon

Gesquiere, L. R.; Zieglerc, T. E.; Chena, P. A.; Epsteina, K. A.; Albertsb, S. C.; Altmann, J. Measuring fecal testosterone in females and fecal estrogens in males: comparison of RIA and LC/MS/MS methods for wild baboons (*Papio cynocephalus*). *Gen Comp Endocrinol*. **2014**, 204, 141–149.

Progestserone – Foal

Müller, V.; Curcio, B. R.; Toribio, R. E.; Feijó, L. S.; Borba, L. A.; Canisso, I. F.; Nogueira, C. E. W. Cortisol, progesterone, 17α-OH-progesterone, and pregnenolone in foals born from mare's hormone-treated for experimentally induced ascending placentitis. *Theriogenology*. **2019**, 123, 139-144.

Prolactin – Rat

Harkitis, P.; Daskalopoulos, E. P.; Malliou, F.; Lang, M. A.; Marselos, M.; Fotopoulos, A.; Albucharali, G.; Konstandi, M. Dopamine D2-Receptor Antagonists Down-Regulate CYP1A1/2 and CYP1B1 in the Rat Liver. *PloS ONE*. **2015**, 10, 10, e0128708.

T3 – Whale

Wasser, S. K.; Lundin, J. I.; Ayres, K.; Seely, E.; Giles, D.; Balcomb, K.; et al. Population growth is limited by nutritional impacts on pregnancy success in endangered Southern Resident killer whales (*Orcinus orca*). *PLoS ONE*. **2017**, 12, 6.

Testosterone – Rat

Krishnan, K.; Mittal, N.; Thompson, L.M.; Rodriguez-Santiago, M.; Duvauchelle, C.L.; Crews, D.; Gore, A. C. Effects of the Endocrine-Disrupting Chemicals, Vinclozolin and Polychlorinated Biphenyls, on Physiological and Sociosexual Phenotypes in F2 Generation Sprague-Dawley Rats. *Environ Health Perspect*. **2018**, 126, 9, 97005.

Why is Radioimmunoassay Still the Best Choice?

Highly sensitive

With RIA you can achieve ultra-low detection limits for a wide variety of analytes, with analytical sensitivity reported as low as picogram per milliliter quantities. The combined specificity of an immune reaction (antibody:antigen), as well as our ability to detect very low amounts of radioactive decay, gives the radioimmunoassay a great advantage over many other test methodologies.

Highly specific

A great advantage of any immunoassay versus another testing method is the specificity of the assay. The binding interaction between the analyte and antibody is generally quite specific, even in the presence of other components in the sample; therefore, you do not always need to extract your sample to a more purified form before beginning. Of course, certain analytes may cross-react in the assay based on similar chemical properties, however the majority of compounds say, in blood, will not interfere with the assay's ability to seek out your desired analyte.

Large variety of species and sample types validated

For well over 40 years researchers have been utilizing RIAs in their experiments covering a wide variety of animal models and sample types. Thousands of scientific publications can be found documenting the use, validation, and detailed results for RIA detection of many different analytes, species and sample types. From insulin to progesterone, alligator to zebra, and serum to feathers, RIAs have such an incredible collection of references to help guide any researcher with their experiment.

Small sample volume required

Most Radioimmunoassays only require a very small sample volume, as low as 10 µL. This is due to the high sensitivity RIAs allow based on their principle of highly specific antigen:antibody binding, as well as the ability to detect trace amounts of radioactivity using a gamma counter. In addition to reducing the amount of sample you would need to collect, a lesser volume requirement also allows you to work with much smaller animal models if needed.

Relatively easy to run

Most lab technicians and scientists are able to run the relatively simple RIA protocols with just a general knowledge of laboratory technique and skill. When compared to other methodologies, such as HPLC or Mass Spectrometry, RIA procedures are relatively easy to run. Also, in Coated Tube RIAs - when the antibody is bound to the tube - less steps are required because there is no need to precipitate out the bound antigen, eliminating the need for a second antibody, charcoal or other agent, and no centrifugation is required.

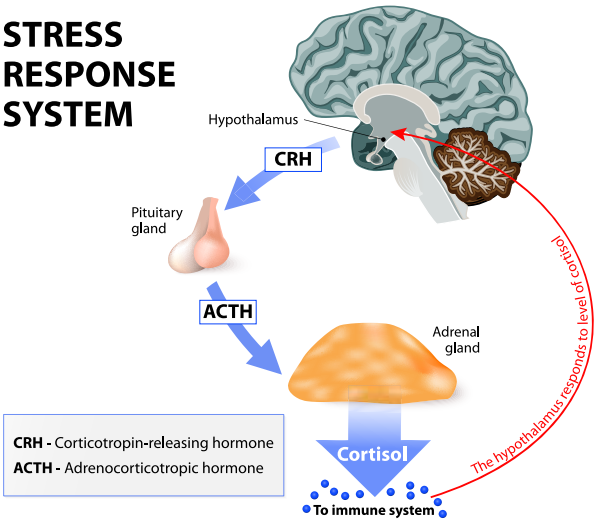
Low cost

Running an RIA requires the use of basic equipment already found in most laboratories, and the interpretation is done using a gamma counter, which is relatively inexpensive when compared with other larger instrumentation such as HPLC or Mass Spectrometry. Also, you can avoid radioactive disposal costs by storing the waste for the recommended period of time, and then disposing of it as ordinary waste.

Long history of use, extremely reliable

Since its development in 1959 by Dr. Yalow and Dr. Berson, Radioimmunoassays have played a critical role in detecting and measuring analytes in bodily fluids at infinitesimal levels, and it all began with insulin. RIA is one of the most important techniques in clinical biochemistry for the quantitative analysis of hormones and many other analytes, and it has been trusted in labs for over 40 years.

Stress often leads to changes in the level of many hormones in the body including glucocorticoids, catecholamines, growth hormones and prolactin, allowing the individual to adapt to the new situation and cope with challenges. The initial response typically involves catecholamines (epinephrine and norepinephrine) within seconds of experiencing a stressor, followed by release of CRH to stimulate the release of ACTH. There is often a decrease in gonadotropin, prolactin, growth hormone and glucagon. The second, slower response involves the increase in the level of glucocorticoids within minutes, followed by the onset of glucocorticoid-mediated actions about an hour after the onset of the stressor, including cardiovascular effects, immunity/inflammation, metabolism, neural function and reproduction.



Glucocorticoids

Cortisol, or corticosterone in many species, is considered a "stress hormone" and plays a critical role in the body's response to stressful situations. As part of the body's fight-or-flight response, cortisol gives the body a natural energy boost by stimulating certain metabolic functions and fueling muscles to allow a response to a threatening situation. Cortisol production is controlled by the pituitary gland and hypothalamus, two regions of the brain that work together to direct the production of cortisol by the adrenal glands.

> *"Accurate assessment of plasma corticosterone, the primary stress hormone in rodents, is an essential part of characterizing the stress response in experimental animals."*
>
> - Bekhbat, Mandakh, et al. "Measuring corticosterone concentrations over a physiological dynamic range in female rats." Physiology & behavior 194 (2018): 73-76.

Catecholamines

Norepinephrine (noradrenaline), epinephrine (adrenaline) and dopamine are neurotransmitters that are released as part of the body's fight-or-flight response when a stressor is encountered. These hormones are part of the sympathetic nervous system and influence immediate physiological changes in the body to deal with a danger or threat. Epinephrine can quickly increase the heart rate and respiration, norepinephrine signals the release of cortisol to prepare the body for long-term stress, and dopamine assists with the body's ability to cope with the stressful situation. These same catecholamines are also part of the parasympathetic nervous system and help to return the body to a pre-stressed state once the threat is no longer present. Prolonged exposure to catecholamines can lead to negative physical and psychological outcomes, such as mood disorders, chronic inflammation, sleep disturbances, cardiovascular issues and metabolic disorders.

Growth Hormones

During stressful situations, growth hormone is released to stimulate growth and cell reproduction in the body. By regulating the production of IGF-1, growth hormone raises the concentration of glucose and free fatty acids which can nourish the body during a stressful situation. During psychological stress, however, growth hormone responses are rarely seen and there appears to be a defect in growth hormone secretion.

Prolactin

One of the most versatile hormones known, prolactin promotes physiological responses to reproduction, stress, adaptation and neuroprotection. This peptide hormone crosses the blood-brain barrier and contributes to the regulation of the body's stress response by inhibiting the hypothalamic-pituitary-adrenal (HPA) axis. Prolactin is also involved in modulating psychopathological states such as depression and anxiety.

MP Bio Immunoassays for Stress Research

Analyte	Assay Type	Sample Type	Tests	Cat. No.	Sample Vol.	Sensitivity	Species*
ACTH	RIA (DA)	Plasma	50	07106101	100 µL	5.7 pg/mL	Human
			100	07106102			
Corticosterone	EIA / ELISA	Serum or Plasma	96	07DE9922	10 µL	4.1 ng/mL	Rat, Mouse
	RIA (DA)		100	07120102		Inquire	
			200	07120103			
Cortisol	RIA (CT)	Serum, Plasma or Urine	100	06B256440	25 µL	0.07 µg/dL	Human
		Serum or Plasma	100	07221102		0.17 µg/dL	
			500	07221105			
			1000	07221106			
	EIA / ELISA	Saliva	96	07P631		0.0519 ng/mL	
		Serum	96	07M21602		91.5 pg	
	ChLIA	Serum or Plasma	96	07M3675A		0.27 µg/dL	
Growth Hormone (GH)	RIA	Plasma, Tissue or Cell Culture	120	07RK551	100 µL	0.16 ng/tube	Rat
	IRMA	Serum	100	07RK5CT	50 µL	0.04 µIU/mL	Human
	EIA / ELISA		96	07BC1033		0.5 ng/mL	
	ChLIA		96	07M1775A		0.118 µIU/mL	
Prolactin	RIA	Plasma, Tissue or Cell Culture	120	07RK553	100 µL	0.07 ng/tube	Rat
	EIA / ELISA	Serum	96	07BC1037	50 µL	2.0 ng/mL	Human
			96	07DE9944	25 µL	0.4 ng/mL	Canine
			96	07DE9966		0.6 ng/mL	Rat
	IRMA		100	07RK780CT	100 µL	0.04 ng/mL	Human
	ChLIA		96	07M775A	25 µL	0.8 ng/mL	
2-CAT Fast Track [Adrenaline (Epinephrine) and Noradrenaline (Norepinephrine)]	EIA / ELISA	Plasma or Urine	2 x 96	07LE6500	10 or 300 µL	Adrenaline: 0.01 ng/mL plasma, 0.9 ng/mL urine Noradrenaline: 0.036 ng/mL plasma, 1.7 ng/mL urine	Human
		Urine	2 x 96	07LE7500	25 µL	Adrenaline: 0.5 ng/mL Noradrenaline: 1.7 ng/mL	Human
	RIA	Plasma or Urine	100	07LR6500	10 or 300 µL	Adrenaline: 19 pg/mL plasma, 0.39 ng/mL urine Noradrenaline: 42 pg/mL plasma, 1.1 ng/mL urine	Human
3-CAT Fast Track [Adrenaline (Epinephrine), Noradrenaline (Norepinephrine) and Dopamine]	EIA / ELISA	Plasma or Urine	3 x 96	07LE6600	10 or 300 µL	Adrenaline: 0.01 ng/mL plasma, 0.9 ng/mL urine Noradrenaline: 0.036 ng/mL plasma, 1.7 ng/mL urine Dopamine: 0.049 ng/mL plasma, 2.5 ng/mL urine	Human
		Urine	3 x 96	07LE7600	25 µL	Adrenaline: 0.5 ng/mL Noradrenaline: 1.7 ng/mL Dopamine: 3 ng/mL	Human
	RIA	Plasma or Urine	100	07LR6600	10 µL for Urine 300 µL for Plasma	Adrenaline: 0.01 ng/mL plasma, 0.3 ng/mL urine Noradrenaline: 0.05 ng/mL plasma, 1.5 ng/mL urine Dopamine: 0.02 ng/mL plasma, 4.5 ng/mL urine	Human
Adrenaline Fast Track	EIA / ELISA	Plasma or Urine	96	07LE6100	10 or 300 µL	Plasma: 0.01 ng/mL Urine: 0.9 ng/mL	Human
Adrenaline	EIA / ELISA	Urine	96	07LE7100	25 µL	0.5 ng/mL	Human
Dopamine Fast Track	EIA / ELISA	Plasma or Urine	96	07LE6300	10 or 300 µL	Plasma: 0.049 ng/mL Urine: 2.5 ng/mL	Human
		Urine	96	07LE7300	25 µL	3 ng/mL	Human
	RIA	Plasma or Urine	96	07LR6300	10 or 300 µL	Plasma: 29 pg/mL Urine: 3.0 ng/mL	Human
Noradrenaline (Norepinephrine) Fast Track	EIA / ELISA	Plasma or Urine	96	07LE6200	10 or 300 µL	Plasma: 0.036 ng/mL Urine: 1.7 ng/mL	Human
		Urine	96	07LE7200	25 µL	1.7 ng/mL	Human
	RIA	Plasma or Urine	100	07LR6200	10 or 300 µL	Plasma: 42 pg/mL Urine: 1.1 ng/mL	Human

**Other species have been cited in scientific publications.*
All kits are available for research use. Some kits may be cleared for IVD use. Contact us for more information.
CT = coated tube DA = double antibody

MP Bio Corticosterone RIA Kit

Advantages

- **Highly sensitive***
- **Simple and convenient compared with HPLC or GC-MS**
- **Flexible** – Various animal model references (rodents, avian, marine, amphibian, reptiles, non-human primates and many more!)
  – Double antibody method able to accommodate different sample types
- **Efficient** – uses unextracted serum or plasma, no protein denaturation step required
- **Outstanding reliability for decades** – over 2,000 publications
- **Unparalleled technical support to guide you through your assay**

Size	Cat. No.
100 Tubes	07120102
200 Tubes	07120103

MP Bio Corticosterone Radioimmunoassay Outperforms 3 ELISA Assays

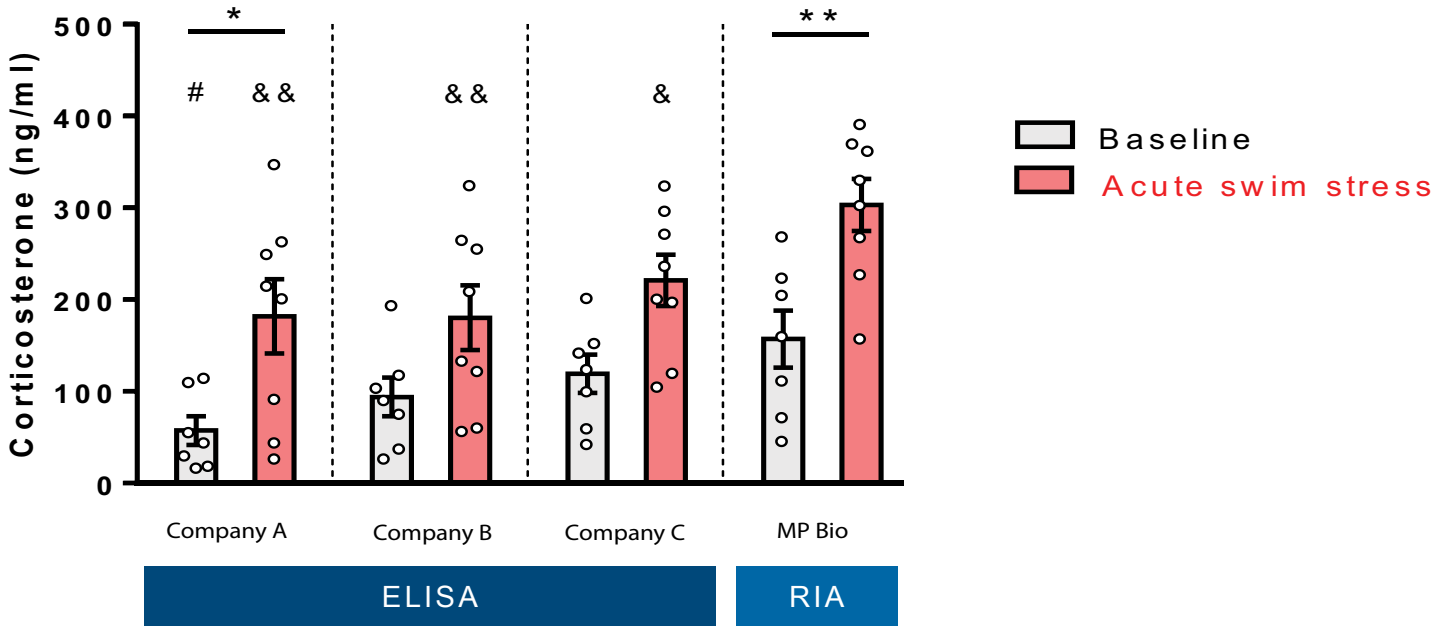


*Fig 1 ...Multiple comparisons showed that **at baseline, the RIA kit yielded significantly higher corticosterone concentrations** compared to Company A assay (#, $p < .05$). **In the acute stress condition, the RIA kit also yielded significantly greater concentrations** compared to Company A [(&&, $p < .0001$), B (&&, $p < .0001$), and C assays (&, $p < .01$), respectively]... Bekhbat, M.; Glasper E. R.; Rowson, S. A.; Neigh, G. N. Measuring corticosterone concentrations over a physiological dynamic range in female rats. *Physiol. Behav.* **2018**, 194, 73–76.

Hundreds of species validated using the MP Bio Corticosterone RIA Kit

We measured plasma corticosterone concentrations in each individual blood sample using a commercially available corticosterone I^{125} radioimmunoassay kit (Cat. #07-120102, ICN Biomedicals, Costa Mesa, California)…*We conducted parallelism and recovery of exogenous corticosterone validation assays on two pooled plasma samples (low and high; each pool consisted of plasma from five individuals) from each bird species to validate plasma corticosterone RIA utility, accuracy, and precision (Jeffcoate 1981).*

Washburn, B. E.; Morris, D. L.; Millspaugh, J. J.; Faaborg, J.; Schulz, J. H. Using a commercially available radioimmunoassay to quantify corticosterone in avian plasma. *Condor.* **2002**, 104, 558–563.

Levels of plasma CORT were determined in 17 assays using double-antibody radioimmunoassay kits (Catalog # 07–102103, MP Biomedical, Orangeburg, NY, USA) that had already been validated for use in our study system *[32]…Therefore, from our data it is apparent that garter snakes of the slow-living ecotype are exposed to overall higher levels of circulating glucocorticoids – both baseline and stressed-induced – than garter snakes of the fast-living ecotype. Our study, thus, shows an association between glucocorticoid levels and pace of life in a reptilian system, as has been recently documented for birds [4,15], supporting the possible role of glucocorticoids as mediators of life-history trade-offs in this vertebrate group.*

Palacios, M. G.; Sparkman, A. M.; Bronikowski, A. M. Corticosterone and pace of life in two life-history ecotypes of the garter snake *Thamnophis elegans. General and Comparative Endocrinology.* **2012**, 175, 3, 443-448.

Serum corticosterone was analyzed using a radioimmunoassay and protocol from MP Biomedicals (Orangeburg, NY, USA)*…. Increased levels of corticosterone are well known to inhibit hippocampal neurogenesis [8,9] and adrenalectomy increases the number of surviving newborn neurons [10], supporting a role for corticosterone in regulating hippocampal neurogenesis.*

Lindqvist, A.; Mohapel, P.; Bouter, B.; Frielingsdorf, H.; Pizzo, D.; Brundin, P.; Erlanson-Albertsson, C. High-fat diet impairs hippocampal neurogenesis in male rats. *European Journal of Neurology.* **2006**, 13, 1385-1388.

Corticosterone was determined by double antibody radioimmunoassay (125I-RIA, MP Biomedicals, 07-120103) with modifications validated for several avian species (Washburn et al. 2002; Newman et al. 2008; Schmidt and Soma 2008)*… In summary, we found that experimental manipulation of plasma corticosterone had a positive effect on foraging behavior, which resulted in direct increases in chick growth even in females that were pushed toward very high levels and had temporarily suspended foraging activity.*

Crossin, G. T.; Trathan, P. N.; Phillips, R. A.; Gorman, K. B.; Dawson, A.; Sakamoto, K. Q.; Williams, T.D. Corticosterone Predicts Foraging Behavior and Parental Care in Macaroni Penguins. *The American Naturalist.* **2012**, 180, 1, E31-E41.

Faecal extracts were also analysed using a double-antibody 125I-labelled corticosterone RIA (MP Biomedicals, Orangeburg, NY, USA), *previously validated for jaguar faeces (Conforti et al., 2012), according to the manufacturer's instructions, except that all reagent volumes were halved…The biological validity of the corticosterone RIA is further supported by the results of a previous study of captive jaguars that were challenged with exogenous adrenocorticotrophic hormone (Conforti et al., 2012).*

Mesa-Cruz, J. B.; Brown, J. L.; Kelly, M. J. Effects of natural environmental conditions on faecal glucocorticoid metabolite concentrations in jaguars (*Panthera onca*) in Belize. *Conserv Physiol.* **2014**, 2, 1.

www.mpbio.com

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Corticosterone – Snake

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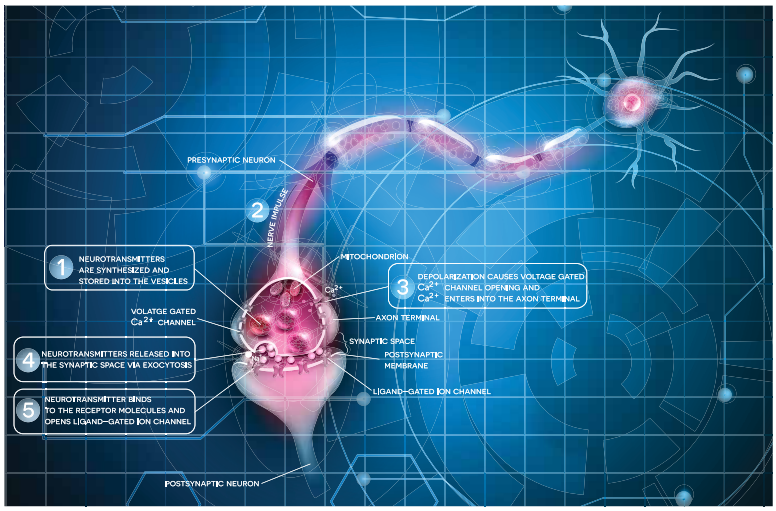
Neurotransmitters – Biogenic Amines

Neurotransmitters act by transmitting a signal across a synapse between neurons. Biogenic amines are a specific class of neurotransmitters derived from amino acids. There are five known biogenic amines: dopamine, epinephrine, norepinephrine, histamine and serotonin. Research studies regarding these neurotransmitters can include topics such as the fight-or-flight stress response, gastrointestinal physiology, and disorders caused by an imbalance or dysregulation of neurotransmitters.



Dopamine

The main region of the brain containing dopamine is the corpus striatum, which has an important role in the coordination of body movements. Certain disorders that lead to motor dysfunction, such as Parkinson's disease, are cause by the degeneration of dopaminergic neurons. Dopamine is also involved in other physiological functions such as motivation and reward, which can be stimulated by a variety of reinforcing stimuli such as food, sex and drugs of abuse. Cocaine and other addictive drugs act by binding to the dopamine transporter, which prevents it from removing dopamine from the synapse, leading to an accumulation of dopamine and the sensation of euphoria. Dopamine plays a critical role in disorders such as OCD (Obsessive Compulsive Disorder), where the anticipation of a reward can drive compulsive behaviors.

Epinephrine (adrenaline)

In response to a dangerous or stressful situation, epinephrine rapidly prepares the body for action. It increases the supply of oxygen and glucose to the brain and muscles, and at the same time suppresses other non-emergency bodily functions, such as digestion.

Norepinephrine (noradrenaline)

As a neurotransmitter, norepinephrine functions to increase alertness and arousal, which can help the body increase its reaction time. As a hormone released into the bloodstream, norepinephrine can increase the heart rate, stimulate the release of glucose into the blood and increase blood flow to muscles. On the other hand, low levels of norepinephrine can make it difficult to focus and are thought to play a role in conditions such ADHD (Attention Deficit Hyperactivity Disorder) and Depression.

Histamine

Similar to norepinephrine, histamine can influence arousal and attention. Primarily known for its usefulness in response to allergic reactions, histamine can also act as a sedative when it crosses the blood-brain barrier. Histamine is also thought to have a role in many other neurological processes, such as the sleep-wake cycle, behavioral state, energy metabolism, stress, reproduction and neurocognitive function.

Serotonin

Serotonin, along with its derivative melatonin, regulate sleep and wakefulness, mood, appetite, memory and sexual desire. Serotonin is a hormone that increases positivity and energy, whereas melatonin has the opposite effect and helps the body wind down to a more lethargic state. Both serotonin and melatonin are heavily regulated by light and darkness, and a dysregulation of either can lead to sleep and mood disorders.

MP Bio Immunoassays for Detection of Biogenic Amines

Analyte	Assay Type	Sample Type	Tests	Cat. No.	Sample Vol.	Sensitivity	Species*
2-CAT Fast Track [Adrenaline (Epinephrine) and Noradrenaline (Norepinephrine)]	EIA / ELISA	Plasma or Urine	2 x 96	07LE6500	10 or 300 µL	Adrenaline: 0.01 ng/mL plasma, 0.9 ng/mL urine Noradrenaline: 0.036 ng/mL plasma, 1.7 ng/mL urine	Human
		Urine	2 x 96	07LE7500	25 µL	Adrenaline: 0.5 ng/mL Noradrenaline: 1.7 ng/mL	Human
	RIA	Plasma or Urine	100	07LR6500	10 or 300 µL	Adrenaline: 19 pg/mL plasma, 0.39 ng/mL urine Noradrenaline: 42 pg/mL plasma, 1.1 ng/mL urine	Human
2-MET Fast Track [Free Metanephrine and Free Normetanephrine]	EIA / ELISA	Plasma	2 x 96	07LE8300	200 µL	Metanephrine: 14.9 pg/mL Normetanephrine: 17.9 pg/mL	Human
	RIA		100	07LR8300		Metanephrine: 5.8 pg/mL Normetanephrine: 21.4 pg/mL	Human
2-MET Fast Track [Metanephrine and Normetanephrine]	EIA / ELISA	Urine	2 x 96	07LE8600	25 µL	Metanephrine: 13 ng/mL Normetanephrine: 23 ng/mL	Human
	RIA		100	07LR8600		Metanephrine: 8 ng/mL Normetanephrine: 22 ng/mL	Human
3-CAT Fast Track [Adrenaline (Epinephrine), Noradrenaline (Norepinephrine) and Dopamine]	EIA / ELISA	Plasma or Urine	3 x 96	07LE6600	10 or 300 µL	Adrenaline: 0.01 ng/mL plasma, 0.9 ng/mL urine Noradrenaline: 0.036 ng/mL plasma, 1.7 ng/mL urine Dopamine: 0.049 ng/mL plasma, 2.5 ng/mL urine	Human
		Urine	3 x 96	07LE7600	25 µL	Adrenaline: 0.5 ng/mL Noradrenaline: 1.7 ng/mL Dopamine: 3 ng/mL	Human
	RIA	Plasma or Urine	100	07LR6600	10 µL for Urine 300 µL for Plasma	Adrenaline: 0.01 ng/mL plasma, 0.3 ng/mL urine Noradrenaline: 0.05 ng/mL plasma, 1.5 ng/mL urine Dopamine: 0.02 ng/mL plasma, 4.5 ng/mL urine	Human
5-HIAA (5-hydroxyindoleacetic acid)	EIA / ELISA	Urine	96	07L119602	50 µL	0.17 mg/L	Human
Adrenaline (Epinephrine) Fast Track	EIA / ELISA	Plasma or Urine	96	07LE6100	10 or 300 µL	Plasma: 0.01 ng/mL Urine: 0.9 ng/mL	Human
Adrenaline (Epinephrine)	EIA / ELISA	Urine	96	07LE7100	25 µL	0.5 ng/mL	Human
Dopamine Fast Track	EIA / ELISA	Plasma or Urine	96	07LE6300	10 or 300 µL	Plasma: 0.049 ng/mL Urine: 2.5 ng/mL	Human
		Urine	96	07LE7300	25 µL	3 ng/mL	Human
	RIA	Plasma or Urine	96	07LR6300	10 or 300 µL	Plasma: 29 pg/mL Urine: 3.0 ng/mL	Human
Histamine	EIA / ELISA	Plasma or Urine	96	07L109602	10 or 25 µL	Plasma: 0.12 ng/mL Urine: 0.3 ng/mL	Human
Melatonin	EIA / ELISA	Saliva	96	07P634A	50 µL	0.62 pg/mL	Human
		Serum or Plasma	96	07P534A	25 µL	2.5 pg/mL	Human
Metanephrine (Free) Fast Track	EIA / ELISA	Plasma	96	07LE8100	200 µL	14.9 pg/mL	Human
Metanephrine Fast Track	EIA / ELISA	Urine	96	07LE8400	25 µL	13 ng/mL	Human
	RIA		2 x 100	07LR8400		8 ng/mL	Human
Noradrenaline (Norepinephrine) Fast Track	EIA / ELISA	Plasma or Urine	96	07LE6200	10 or 300 µL	Plasma: 0.036 ng/mL Urine: 1.7 ng/mL	Human
		Urine	96	07LE7200	25 µL	1.7 ng/mL	Human
	RIA	Plasma or Urine	100	07LR6200	10 or 300 µL	Plasma: 42 pg/mL Urine: 1.1 ng/mL	Human
Normetanephrine (Free) Fast Track	EIA / ELISA	Plasma	96	07LE8200	200 µL	17.9 pg/mL	Human
Normetanephrine Fast Track	EIA / ELISA	Urine	96	07LE8500	25 µL	23 ng/mL	Human
	RIA		100	07LR8500		22 ng/mL	Human
Serotonin Fast Track	EIA / ELISA	Serum, Urine or Platelets	96	07LE8900	25 µL	6.2 ng/mL	Human
	RIA		100	07LR8900		6.6 ng/mL	Human

**Other species have been cited in scientific publications.*
All kits are available for research use. Some kits may be cleared for IVD use. Contact us for more information.
CT = coated tube DA = double antibody

Studying Sleep?

Measure Melatonin in saliva faster than ever, using less sample volume

- **FAST**
  Short 2 hour incubation, no extraction step required
- **EFFICIENT**
  Uses less sample volume (50 µL)
- **HIGHLY SENSITIVE**
  Measures < 1pg/mL
- **ACCURATE**
  Excellent sample-to-sample correlation with Mass Spec

MP Bio Melatonin ELISA Kits for Saliva *(or serum, see page 17)*

	MP Bio	Company S	Company D	Company I	Company A	Company B
Incubation time (assay)	**2 hours**	3 hours	20 hours	20 hours	2 hours	24 hours
Sample Volume	**50 µL**	100 µL	100 µL	100 µL	100 µL	200 µL
Extraction steps required?	**no**	no	yes	no	yes	yes
Sensitivity	**0.62 pg/mL**	1.37 pg/mL	0.3 pg/mL	0.3 pg/mL	162 pg/mL	0.5 pg/mL
Intra-assay CV	**<5.1%**	<8.2%	-	<10.8%	<13.74%	-
Inter-assay CV	**<10.9%**	<15.6%	-	<13.0%	<17.54%	-

FAQs – MP Bio Immunoassays

What is the difference between a double antibody (DA) and a coated tube (CT) RIA Kit?

A double antibody RIA works in solution and uses a second antibody to precipitate the antibody-analyte complexes that have formed. This method requires a few extra steps, however it is much more adaptable to modifications. A coated tube RIA has the antibody bound to the solid support (tube), so the unbound analyte can simply be decanted or aspirated. This method requires fewer steps, however the kit is less flexible to allow for adaptations.

Has anyone else used this kit in a different animal model?

Many researchers have adapted and validated our kits for use in a wide variety of species. See page 20 for some tips.
You may either contact us to find out or search published literature.

I am having a difficult time finding publications that used the same species I am using, any tips?

Sometimes our kits are referenced using other names from our long history – try expanding your search to include terms such as "ICN", "Immuchem", "MP Diagnostics", or even our historical locations such as"Orangeburg"or "Costa Mesa".

I only need a component of a kit (e.g. tracer), do you sell the individual components separately?

Most often we can sell components individually, please contact us with your specific request.

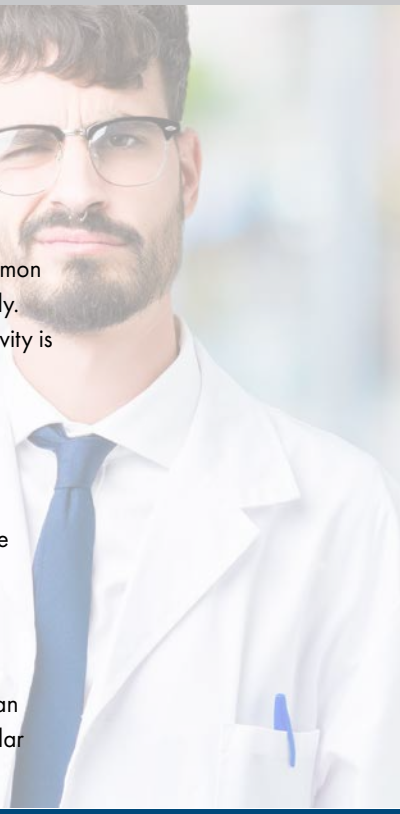
What is the typical shelf-life for an RIA Kit?

8 weeks from the production release date, please contact us for the current production schedule.

Where can I find more details regarding a specific kit?

We can send you the IFU for the kit, where many of the details you need can be found.
Any other questions we are happy to help you with - see the back cover for our contact info.

Common RIA myths debunked



"I do not have a gamma counter in my lab, so I cannot use RIA"

Ask other labs in your institution to borrow their gamma counter,
or check with your RSO for labs that may have one.

"I do not want to be exposed to high levels of radioactivity"

Most people are unaware that the amount of radioactivity in our RIA kits is actually less dangerous than many common things we are exposed to everyday, however it is still important to take precautions and handle the product properly. Our RIA kits generally only contain between 1 to 4 microcuries of ^{125}I, so with the short half-life of ^{125}I, the radioactivity is barely detectable after 1-2 years of decay.

"I do not want to have to pay for the disposal of radioactive waste"

Most of our RIA kits use ^{125}I, which has a half-life of 60 days. Most jurisdictions allow this material to be disposed of as ordinary waste after 10 half-life's have past (2 years). Many labs that work with ^{125}I have a system to store the radioactive waste for 2 years, and then dispose of it as ordinary waste.

"EIA assays work just as well as RIA assays"

While many EIA assays can provide you with the data you need, RIA assays in general are much more sensitive than EIA assays for the same analyte because they have a lower limit of detection, which may be critical in your particular research. Also, RIA kits can be easier to adapt to your specific experiment and animal model than EIA assays.

Using Human RIA and EIA Kits with Animal Serum

MP Biomedicals offers several RIA and EIA kits that were designed for use with human serum or plasma samples.
Over the years, researchers have adapted many of them for use with various animal species.

Here are some general guidelines to determine whether there will be sufficient cross reactivity to a specific animal sample to get satisfactory results:

- 1) Non-species-specific hormones; the antibody in our human kits should be recognized by other animal species.
  - **Thyronines (T4, T3)**
  - **Steroids (testosterone, cortisol, estradiol, progesterone, etc.)**
  - **Small molecule peptides (insulin, ACTH)**
- 2) Species-specific hormones; the antibody in our human kits will not generally be recognized by other animal species, but in some cases there may be partial recognition for some epitopes.
  - **Large molecule peptides (TSH, LH, FSH)**

There are three primary areas of concern in adapting a specific kit to animal samples. Those issues are "expected values, matrix differences, and sample size". Since the assay was developed for use in human samples, the range of the standard curve was designed for the expected values in humans. Often animals have different normal and abnormal ranges. Depending on the species, this range may or may not fall on the standard curve.

The second concern involves the serum/protein matrix. Again, since the assay was designed for use with human samples, differences in the protein matrix of the animal samples can affect the assay result. If absolute levels are required vs relative levels, a sample extraction may be necessary.

Lastly, depending on the amount of sample you have available, there may be issues with the volume of sample required for each test. If you know the expected ranges for your samples our technical service department can see if they fall on the standard curve. Matrix questions are most easily identified by testing an animal sample that has had the steroids and thyronines removed by charcoal stripping. Although, if your samples do not fall near the ends of the standard curve, matrix differences would probably be minimal. They are of greatest concern when trying to measure samples that are near the lowest standard point.

Animal Applications for Human Diagnostic Kits - Feasibility Checklist

- ✓ Does the diagnostic range of the analyte you are measuring in fall within the standard curve range of the kit? Dilution of the sample may be necessary (too high), or the expected value may fall below the first standard level. The addition of a lower standard (diluting the first kit standard) may be possible with certain assay systems where there is room for enhanced sensitivity in the standard curve.
- ✓ What is the sample size required in the assay? This can be an issue when working with small animals.
- ✓ Is the analyte you want to measure species-specific? For steroids (ex: Progesterone, Testosterone, etc.) and Thyronines (T3, T4, etc) this is NOT an issue. They are not species-specific and will be equally recognized by the kit antibody regardless of the source of the sample to be tested. For polypeptides (ex: LH, FSH, TSH) there may differences between species, making adaptations for alternate, nonhuman uses difficult.
- ✓ Will there be unexpected cross-reactivity issues? There may be other substances (steroids, for example) that are similar in structure to the analyte of interest in the animal sample. Those substances may be present at higher concentrations than seen in humans, resulting in increased "cross-reaction". This may affect the accuracy of the result.
- ✓ Are there matrix issues? The matrix (serum/plasma base of the sample) may be quite different in its protein make up from human serum. This may cause the animal sample to behave differently than a human sample would, producing inaccurate or unreliable results. Matrix issues are one of the most common obstacles in adapting human kits for animal use.

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MP Bio Immunoassays in a Variety of Animal Models

		Mammal																																									
		Rodent										Bovidae						Canine					Cer-vidae		Feline					Mus-telid		Primate							Other				
Kits	Assay	Guinea Pigs	Hamster	Hedgehog	Marmots	Mouse	Porcupine	Rabbit, Hare	Rat	Squirrels	Voles	Antelope	Bovine	Goat	Impala	Sheep	Wildebeast	Coyote	Dogs	Dogs, African Wild	Fox	Wolves	Deer, White Tail	Moose	Cats	Cheetah	Hyena	Jaguar	Leopard, Snow	Ferrets	Sea Otters	Ape	Baboon	Bonobo	Gorilla	Marmoset	Monkey	Primates	Armadillo	Bat	Camelid	Elephant	Equine, Zebra
RIA Kits	2-CAT							✓								✓																													
RIA Kits	ACTH					✓			✓		✓					✓			✓																										✓
RIA Kits	Androstenedione																			✓						✓					✓						✓								
RIA Kits	Corticosterone		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓				✓	✓			✓	✓	✓			✓	
RIA Kits	Corti-cote Cortisol								✓	✓			✓	✓	✓																						✓		✓				✓	
RIA Kits	Cortisol							✓	✓				✓	✓	✓																	✓					✓			✓			✓
RIA Kits	Estradiol					✓			✓				✓	✓	✓	✓			✓						✓									✓				✓	✓					
RIA Kits	T3 (free)					✓													✓			✓																						
RIA Kits	T4 (free)								✓																																				
RIA Kits	Gastrin								✓										✓						✓												✓						✓
RIA Kits	Glucagon					✓			✓										✓																									
RIA Kits	Growth Hormone																																	✓				✓							
RIA Kits	Progesterone	✓				✓			✓				✓	✓	✓																		✓				✓	✓			✓	✓	✓
RIA Kits	Serotonin RIA					✓																																						
RIA Kits	T3 (total)					✓			✓				✓	✓	✓				✓			✓											✓											
RIA Kits	T3 (uptake)					✓			✓																																			
RIA Kits	T4 (monoclonal)					✓			✓				✓	✓	✓	✓			✓														✓											
RIA Kits	Testosterone					✓			✓										✓								✓										✓							
RIA Kits	Total Estrogen					✓	✓		✓			✓	✓	✓	✓					✓												✓		✓				✓					✓	✓
EIA Kits	Cortisol																																										
EIA Kits	Estradiol	✓																						✓																				
EIA Kits	T4 (free)								✓																																				
EIA Kits	HGH					✓			✓																																			
EIA Kits	Insulin |✓|																																									
EIA Kits	Noradrenaline					✓																																						
EIA Kits	Progesterone					✓			✓																																			
EIA Kits	Corticosterone				✓				✓																																			
EIA Kits	Serotonin																																										
EIA Kits	T3 (total)		✓			✓			✓																																			
EIA Kits	T4 (total)					✓			✓																																			
EIA Kits	Testosterone					✓			✓																										✓							

Mammal								Avian																	Fish									Reptile				Amphib-ian				
Other																																									
Giraffe	Kangaroo	Panda	Pig	Rhino	Seals	Whale	Avian	Budgerigar	Canary	Chickens	Condor	Conures	Cranes	Ducks	Finch	Kestrels	Kingbird	Owls	Parrtos	Perch	Quail	Seagulls	Sparrow	Starlings	Fish	Goldfish	Salmon	Shark	Shiner	Stickleback	Tilapia	Toadfish	Trout	Alligators	Lizards, Fence	Snakes	Turtles	Frogs	Salamander	Tadpole	
																																								2-CAT
✓			✓																					✓							✓	✓								ACTH
			✓																																					Androstenedione
	✓			✓	✓	✓	✓	✓		✓	✓	✓	✓	✓					✓			✓											✓		✓	✓	✓			Corticosterone
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✓			✓		✓															✓					✓	✓	✓				✓	✓	✓								Cortisol
			✓											✓	✓						✓													✓			✓				Estradiol
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						✓																		✓			✓														T3 (total)
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																								✓			✓						✓				✓			T4 (monoclonal)
							✓		✓	✓	✓						✓						✓	✓	✓													✓	✓		Testosterone
✓		✓				✓												✓																							Total Estrogen
																		✓																							Cortisol
																																								Estradiol
																																								T4 (free)
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			✓																																					Noradrenaline
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																																								Corticosterone
							✓			✓	✓																														Serotonin
							✓									✓													✓					✓			✓		✓		T3 (total)
		✓					✓									✓								✓	✓				✓					✓			✓		✓		T4 (total)
																✓																		✓							Testosterone

RIA Kits

EIA Kits

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