



User's Manual

# Testosterone rat/mouse ELISA

**RUO**

**REF**

**AR E-8000**



**96 Wells**

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## 1 INTRODUCTION

### 1.1 INTENDED USE

The **LDN Testosterone rat/mouse ELISA** is a competitive immunoassay for the quantitative measurement of testosterone in rat and mouse serum or plasma. **For research use only.**

### 1.2 SUMMARY AND EXPLANATION

Testosterone is a steroid hormone from the androgen group synthesized by the Leydig cells in the testes in males, the ovaries in females, and adrenal glands in both sexes. It exerts a wide-ranging influence over sexual behaviour, muscle mass and strength, energy, cardiovascular health and bone integrity.

Testosterone biosynthesis coincides with the spermatogenesis and fetal Leydig cell differentiation in the male rat. Several *in vivo* models including hormone-suppression, hormone-restoration and hypophysectomy were established for the study of the hormonal regulation of spermatogenesis by testosterone (1-3).

In the Brown Norway rat, serum testosterone levels decrease with aging, accompanied by increases in serum FSH. The capacity of Leydig cells to produce testosterone is higher in young than in old rats (4). Testosterone secreted during late gestational and neonatal periods causes significant brain sexual dimorphism in the rat. This results in both sex-specific behaviour and endocrinology in adults (5).

Analyses concerning the regulation of synthesis reveal that testosterone is able to regulate its own synthesis and indicate that this autoregulation is the result of rapid, specific inhibition by testosterone of 17  $\alpha$ -hydroxylase activity (6).

## 2 PRINCIPLE

The **LDN Testosterone rat/mouse ELISA Kit** is a solid phase enzyme-linked immunosorbent assay (ELISA), based on the principle of competitive binding. An unknown amount of testosterone present in the sample and a defined amount of testosterone conjugated to horseradish peroxidase compete for the binding sites of testosterone antiserum coated to the wells of a microplate. After one-hour incubation on a shaker the microplate is washed four times. After addition of the substrate solution the concentration of testosterone is inversely proportional to the optical density measured.

## 3 WARNINGS AND PRECAUTIONS

1. For professional use only.
2. Before starting the assay, read the instructions completely and carefully. Use the valid version of the package insert provided with the kit. Be sure that everything is understood.
3. Do not mix reagents of different lots. Do not use expired reagents.
4. The microplate contains snap-off strips. Unused wells must be stored at 2 - 8°C in the sealed foil pouch and used in the frame provided.
5. Avoid contact with Stop Solution. It may cause skin irritation and burns.
6. Pipetting of samples and reagents must be performed as quickly as possible and in the same sequence for each step.
7. Change pipette tips between samples, controls and reagents to avoid carry over contamination.
8. Use reservoirs only for single reagents. This especially applies to the substrate reservoirs. Using a reservoir for dispensing a substrate solution that had previously been used for the conjugate solution may turn solution colored. Do not pour reagents back into vials as reagent contamination may occur.
9. Mix the contents of the microplate wells thoroughly to ensure good test results. Do not reuse microwells.
10. Do not let wells dry during assay; add reagents immediately after completing the rinsing steps.
11. Assay reagents contain Proclin against microbial growth. In case of contact with eyes or skin, flush immediately with water.
12. All reagents should be at room temperature (21-26°C) before use. Temperature will affect the absorbance readings of the assay. However, values for the patient samples will not be affected.
13. TMB substrate has an irritant effect on skin and mucosa. In case of contact with skin or eyes, wash thoroughly with water. Please note that extreme temperature changes may cause spontaneous decay of the peroxide.

## 4 REAGENTS

### 4.1 REAGENTS PROVIDED

1. **Microtiterplate**, 12 x 8 (break apart) strips with 96 wells;  
Wells coated with anti-testosterone antibody.
2. **Calibrator 0**, 1 vial, 0.3 ml, ready to use
3. **Calibrator (Calibrator 1-5)**, 5 vials, 0.3 ml each, ready to use;  
Concentrations: 0.1 – 0.4 – 1.5 – 6.0 – 25.0 ng/ml
4. **Incubation Buffer**, 1 vial 11 ml, ready to use;
5. **Enzyme Conjugate**, 1 vial, 7 ml, ready to use;  
Testosterone conjugated to horseradish peroxidase.
6. **Substrate Solution**, 2 vials, 11 ml each, ready to use;  
contains tetramethylbenzidine (TMB) and hydrogen peroxide in a buffered matrix.
7. **Stop Solution**, 1 vial, 7 ml, ready to use;  
contains 2 N Hydrochloric Acid solution.
8. **Wash Solution**, 1 vial, 50 ml (10X concentrated);  
see „Preparation of Reagents“.

**Note:** Additional Calibrator 0 for sample dilution is available upon request.

### 4.2 MATERIALS REQUIRED BUT NOT PROVIDED

- Centrifuge
- A microtiter plate reader capable for endpoint measurement at 450nm
- Microplate mixer operating more than 600 rpm
- Vortex mixer
- Calibrated variable precision micropipettes (10 µl, 50 µl, 100 µl, 200 µl).
- Absorbent paper
- Distilled or deionized water
- Timer
- Semi logarithmic graph paper or software for data reduction

### 4.3 REAGENT PREPARATION

All reagents should be at room temperature before use.

#### Wash Solution:

Dilute 50 ml of 10X concentrated *Wash Solution* with 450 ml deionized water to a final volume of 500 ml.  
*The diluted Wash Solution is stable for at least 3 months at room temperature.*

### 4.4 STORAGE CONDITIONS

When stored at 2°C to 8°C unopened reagents will be stable until expiration date. Do not use reagents beyond this date. Opened reagents must be stored at 2°C to 8°C. Microtiter wells must be stored at 2°C to 8°C. Take care that the foil bag is sealed tightly.

## 5 SPECIMEN

**Serum** - Use a serum separator tube (SST) and allow samples to clot for 30 minutes before centrifugation for 15 minutes at 1000 x g. Remove serum and assay immediately or aliquot and store samples at -20°C. Avoid repeated freeze-thaw cycles.

**Plasma** - Collect plasma using citrate, EDTA, or heparin as an anticoagulant. Centrifuge for 15 minutes at 1000 x g within 30 minutes of collection. Assay immediately or aliquot and store samples at -20°C. Avoid repeated freeze-thaw cycles.

**Please note:** The use of plasma as specimen can result in a diminished precision of this assay.

## 6 ASSAY PROCEDURE

### 6.1 GENERAL REMARKS

- All reagents and specimens must be allowed to come to room temperature before use. All reagents must be mixed without foaming.
- Once the test has been started, all steps should be completed without interruption.
- Use new disposal plastic pipette tips for each standard, control or sample in order to avoid cross contamination.
- Absorbance is a function of the incubation time and temperature. Before starting the assay, it is recommended that all reagents are ready, caps removed, all needed wells secured in holder, etc. This will ensure equal elapsed time for each pipetting step without interruption.
- As a general rule the enzymatic reaction is linearly proportional to time and temperature.

### 6.2 ASSAY PROCEDURE

Each run must include a standard curve.

1. Prepare a sufficient number of microplate wells to accommodate calibrators and samples in duplicates.
- ~~3.2.~~ Dispense **10 µl** of each **Calibrator and Sample** with new disposable tips into appropriate wells.
- ~~4.3.~~ Dispense **100 µl** of **Incubation Buffer** into each well.
4. Add **50 µl Enzyme Conjugate** into each well.
5. Incubate for **60 minutes** at room temperature on a Microplate mixer.

**Important Note:**

Optimal reaction in this assay is markedly dependent on shaking of the microplate!

6. Discard the content of the wells and rinse the wells **4 times** with diluted **Wash Solution** (300 µl per well). Remove as much Wash Solution as possible by beating the microplate on absorbent paper.
7. Add **200 µl** of **Substrate Solution** to each well.
8. Incubate without shaking for **30 minutes** in the dark.
9. Stop the reaction by adding **50 µl** of **Stop Solution** to each well.
10. Determine the absorbance of each well at 450 nm. It is recommended to read the wells within 15 minutes.

### 6.3 CALCULATION OF RESULTS

1. Calculate the average absorbance values for each set of calibrators, controls and patient samples.
2. Using semi logarithmic graph paper, construct a standard curve by plotting the mean absorbance obtained from each standard against its concentration with absorbance value on the vertical (Y) axis and concentration on the horizontal (X) axis.
3. Using the mean absorbance value for each sample, determine the corresponding concentration from the calibration curve.
4. Automated method: Computer programs using cubic spline, 4 PL (4 Parameter Logistics) or Logit-Log are recommended.
5. The concentration of the samples can be determined directly from this calibrator curve. Samples with concentrations higher than that of the highest calibrator have to be further diluted. For the calculation of the concentrations, this dilution factor has to be taken into account.

Conversion to SI units:

Testosterone (pg/ml) x 3.47 = pmol/l

書式変更 : 箇条書きと段落番号

### 6.3.1 Example of Typical Calibrator Curve

Following data are intended for illustration only and should not be used to calculate results from another run.

Standard	Absorbance Units
Calibrator 0 (0 ng/ml)	2.478
Calibrator 1 (0.1 ng/ml)	2.078
Calibrator 2 (0.4 ng/ml)	1.668
Calibrator 3 (1.5 ng/ml)	1.170
Calibrator 4 (6.0 ng/ml)	0.645
Calibrator 5 (25.0 ng/ml)	0.330

## 7 EXPECTED NORMAL VALUES

In order to determine the normal range of serum testosterone in rat, samples from 35 male rats and 20 female rats were collected and analyzed using the LDN Testosterone rat/mouse ELISA kit. The following ranges are calculated with the results of this study.

	Range (ng/ml)	Mean (ng/ml)
<b>Male ♂</b>	0.66 – 5.4	3.06
<b>Female ♀</b>	0.11 – 0.31	0.21

In further studies serum samples of 10 mice were collected between 11.00 am and 3.00 pm und analyzed in a similar manner.

	Range (ng/ml)	Mean (ng/ml)
<b>Male mice ♂</b>	1.7 – 14.4	6.78

It is recommended that each laboratory establish its own normal range since testosterone levels can vary due to handling and sampling techniques.

## 8 PERFORMANCE CHARACTERISTICS

### 8.1 ANALYTICAL SENSITIVITY

The lowest analytical detectable level of testosterone that can be distinguished from the Zero Calibrator is 0.066 ng/ml at the 2SD confidence limit.

## 8.2 SPECIFICITY

The following materials have been evaluated for cross reactivity. The percentage indicates cross reactivity at 50% displacement compared to Testosterone.

Steroid	% Cross reaction
Dihydrotestosterone	69.6
Androstenedione	< 0.1
Androsterone	< 0.1
Epiandrosterone	< 0.1
Dihydroandrosterone	< 0.1
Dihydroxyandrosterone	7.4
Estron	< 0.1
Estradiol	< 0.1
Estriol	< 0.1
Cortisol	< 0.1
11-Deoxycortisol	< 0.1
Progesterone	< 0.1
17OH-Progesterone	< 0.1

## 8.3 REPRODUCIBILITY

### 8.3.1 Intra-Assay

The intra-assay variation was determined by 20 replicate measurements of 3 serum samples within one run. The within-assay variability is shown below:

Mean (ng/ml)	3.23	1.44	0.84
SD	0.21	0.12	0.09
CV (%)	6.50	8.06	11.07
n =	20	20	20

### 8.3.2 Inter-Assay

The inter-assay (between-run) variation was determined by duplicate measurements of 3 serum samples over 10 days.

Mean (ng/ml)	0.29	1.23	9.50
SD	0.03	0.11	0.88
CV (%)	11.3	9.3	9.3
n =	10	10	10

#### 8.4 RECOVERY

Using the Testosterone rat/mouse Calibrator Matrix three spiking solutions were prepared (A = 80 ng/ml, B = 160 ng/ml, C = 240 ng/ml). A 25 µl aliquot of each solution was spiked into 475 µl of six different rat sera with low testosterone concentrations for a spiking ratio of 1 to 19, leaving the serum matrix of the spiked samples relatively intact. All samples were then measured by Testosterone rat/mouse procedure. To calculate expected values 95% of the unspiked values were added to 5% of the spiking solution concentrations (2.5, 5 and 7.5 ng/ml, respectively).

Serum	Spiking Solution	Observed (O)	Expected (E)	O/E %
1	-	0,31	-	-
	A	2,81	3,15	89%
	B	5,31	5,11	104%
	C	7,81	7,27	107%
2	-	0,40	-	-
	A	2,90	3,42	85%
	B	5,40	5,88	92%
	C	7,90	7,90	100%
3	-	0,36	-	-
	A	2,86	2,88	99%
	B	5,36	5,50	97%
	C	7,86	7,50	105%
4	-	0,25	-	-
	A	2,65	2,75	96%
	B	4,65	5,25	89%
	C	7,08	7,75	91%
5	-	0,38	-	-
	A	3,17	2,88	110%
	B	4,79	5,38	89%
	C	7,36	7,88	93%
6	-	0,28	-	-
	A	2,78	2,78	100%
	B	4,61	5,38	86%
	C	7,22	7,78	93%

#### 8.5 LINEARITY

Five native serum samples were assayed undiluted and diluted with the calibrator matrix.

		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Concentration	(ng/ml)	2,54	1,85	1,94	0,75	1,35
Average %	Recovery	101	108	93	97	109
Range of	from	94	107	92	84	91
Recovery %	to	104	109	94	106	123

### 9 LIMITATIONS OF PROCEDURE

Reliable and reproducible results will be obtained when the assay procedure is performed with a complete understanding of the package insert instruction and with adherence to good laboratory practice. Any improper handling of samples or modification of this test might influence the results.

#### 9.1 DRUG INTERFERENCES

Until now no substances (drugs) are known influencing the measurement of rat or mouse testosterone in serum and plasma. Lipemic and haemolysed samples can cause false results.













## 10 REFERENCES











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2. Sun YT, Irby DC, Robertson DM & de Kretser DM (1989): The effects of exogenously administered testosterone on spermatogenesis in intact and hypophysectomized rats. *Endocrinology* **125**, 1000–1010.
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4. Zirkin BR & Chen H. (2000): Regulation of Leydig cell steroidogenic function during aging. *Biol. Reprod.* **63**(4): 977-81
5. Sakuma Y (2009): Gonadal steroid action and brain sex differentiation in the rat. *J. Neuroendocrinol.* **21** (4): 410-4
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## Testosterone rat/mouse ELISA

### SYMBOLS USED WITH LDN ELISA

Symbol	English	Deutsch	Francais	Espanol	Italiano
	European Conformity	CE-Konformitätskennzeichnung	Conforme aux normes européennes	Conformidad europea	Conformità europea
	Consult instructions for use	Gebrauchsanweisung beachten	Consultez le Mode d'emploi	Consulte las Instrucciones	Consulti le istruzioni
	In vitro diagnostic device	In-vitro-Diagnostikum	Diagnostic in vitro	Diagnóstico in vitro	Diagnostica in vitro
	Catalogue number	Katalog-Nr.	Référence	No de catálogo	No. di Cat.
	Lot. No. / Batch code	Chargen-Nr.	No. de lot	Número de lote	Lotto no
	For research use only	Nur für Forschungszwecke	Seulement dans le cadre de recherches	Sólo para uso en investigación	Solo a scopo di ricerca
	Contains sufficient for <n> tests/	Ausreichend für "n" Ansätze	Contenu suffisant pour "n" tests	Contenido suficiente para <n> ensayos	Contenuto sufficiente per "n" saggi
	Storage Temperature	Lagerungstemperatur	Temperature de conservation	Temperatura de conservación	Temperatura di conservazione
	Expiration Date	Mindesthaltbarkeitsdatum	Date limite d'utilisation	Fecha de caducidad	Data di scadenza
	Legal Manufacturer	Hersteller	Fabricant	Fabricante	Fabbricante
<i>Distributed by</i>	Distributor	Vertreiber	Distributeur	Distribuidor	Distributore
<i>Content</i>	Content	Inhalt	Contenu	Contenido	Contenuto
<i>Volume/No.</i>	Volume / No.	Volumen/Anzahl	Volume/Numéro	Volumen/Número	Volume/Quantità
<i>Microtiterwells</i>	Microtiterwells	Mikrotiterwells	Plaques de micro-titration	Pocillos de la Microplaca	Micropozzetti
<i>Antiserum</i>	Antiserum	Antiserum	Antisérum	Antisuero	Antisiero
<i>Enzyme Conjugate</i>	Enzyme Conjugate	Enzymkonjugat	Conjugué enzymatique	Conjugado enzimático	Tracciante enzimatico
<i>Enzyme Complex</i>	Enzyme Complex	Enzymkomplex	Complexe enzymatique	Complex enzimático	Complesso enzimatico
<i>Substrate Solution</i>	Substrate Solution	Substratlösung	Solution substrat	Solución de sustrato	Soluzione di substrato
<i>Stop Solution</i>	Stop Solution	Stopplösung	Solution d'arrêt	Solución de paro	Soluzione d'arresto
<i>Zero Standard</i>	Zero Standard	Nullstandard	Standard 0	Standard 0	Standard zero
<i>Standard</i>	Standard	Standard	Standard	Calibrador	Standard
<i>Control</i>	Control	Kontrolle	Contrôle	Control	Controllo
<i>Assay Buffer</i>	Assay Buffer	Assaypuffer	Tampon d'essai	Tampón de ensayo	Tampone del test
<i>Wash Solution</i>	Wash Solution	Waschlösung	Solution de lavage	Solución de lavado	Soluzione di lavaggio
<i>1N NaOH</i>	1N NaOH	1N NaOH	1N NaOH	1N NaOH	1N NaOH (idrossido di sodio 1N)
<i>1 N HCl</i>	1 N HCl	1 N HCl	1N HCl	1 N HCl	
<i>Sample Diluent</i>	Sample Diluent	Probenverdünnungs-medium	Solution pour dilution de l'échantillon		Diluyente dei campioni
<i>Conjugate Diluent</i>	Conjugate Diluent	Konjugatverdünnungs-medium	Solution pour dilution du conjugué		Diluyente del tracciante

# Testosterone rat/mouse ELISA

Symbol	Portugues	Dansk	Svenska	Ελληνικά
	Conformidade com as normas europeias	Europaeisk overensstemmelse	Europeisk överensstämmelse	Ευρωπαϊκή Συμμόρφωση
	Instruções de uso	Brugermanual	Användar manual	Εγχειρίδιο χρήστη
	Diagnóstico in vitro	In vitro diagnostik	Diagnostik in vitro	in vitro διαγνωστικό
	Catálogo n.º	Katalognummer	Katalog nummer	Αριθμός καταλόγου
	No do lote	Lot nummer	Batch-nummer	Αριθμός Παρτίδος
				
		Indeholder tilstrækkeligt til "n" test	Innehåller tillräckligt till "n" tester	Περιεχόμενο επαρκές για «n» εξετάσεις
	Temperatura de conservação	Opbevaringstemperatur	Förvaringstemperatur	Θερμοκρασία αποθήκευσης
	Prazo de validade	Udløbsdato	Bäst före datum	Ημερομηνία λήξης
	Fabricante	Producent	Tillverkare	Κατασκευαστής
<i>Distributed by</i>				
<i>Content</i>	Conteúdo	Indhold	Innehåll	Περιεχόμενο
<i>Volume/No.</i>	Volume/Número	Volumen/antal	Volym/antal	Όγκος/αριθ.
<i>Microtiterwells</i>	Alvéolos de microtitulação	Mikrotiterbrønde	Brunnar i Mikrotiterplatta	Πηγαδάκια Μικροπιλοδοτήσεως
<i>Antiserum</i>	Anti-soro	Antiserum	Antiserum	Αντιορός
<i>Enzyme Conjugate</i>	Conjugado enzimático	Enzymkonjugat	Enzymkonjugat	Συζευγμένο ενζυμο
<i>Enzyme Complex</i>	Complexo enzimático	Enzymkompleks	Enzymkomplex	Σύμπλοκο ενζύμου
<i>Substrate Solution</i>	Solução de substrato	Substratopløsning	Substratlösning	Διάλυμα υποστρώματος
<i>Stop Solution</i>	Solução de paragem	Stopopløsning	Stopp lösning	Διάλυμα τερματισμού
<i>Zero Standard</i>	Padrão zero	Standard 0	Standard 0	Πρότυπο Μηδέν
<i>Standard</i>	Calibrador	Standard	Standard	Πρότυπα
<i>Control</i>	Controlo	Kontrol	Kontroll	Έλεγχος
<i>Assay Buffer</i>	Tampão de teste	Assay buffer	Assay Buffer	Ρυθμιστικό Διάλυμα Εξέτασης
<i>Wash Solution</i>	Solução de lavagem	Vaskebuffer	Tvätt lösning	Διάλυμα πλύσεως
<i>1N NaOH</i>	1N NaOH	1N NaOH	1N NaOH	1N NaOH
<i>1 N HCl</i>	1 N HCl	1 N HCl	1 N HCl	1 N HCl
<i>Sample Diluent</i>				
<i>Conjugate Diluent</i>				