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K9165109

**BOEHRINGER
MANNHEIM
CORPORATION**

510(k) Summary



Introduction According to the requirements of 21 CFR 807.92, the following information provides sufficient detail to understand the basis for a determination of substantial equivalence.

1. Submitter name, address, contact
Boehringer Mannheim Corporation
2400 Bisso Lane
P.O. Box 4117
Concord, CA 94524-4117
(510) 674 - 0690 extension 8413
FAX (510) 687 - 1850

Contact Person: Yvette Lloyd

Date Prepared: December 13, 1996

2. Device name
Proprietary name: Elecsys® Estradiol Assay
Common name: Electrochemiluminescence assay for the determination of estradiol.

Classification name: System, Test, Estradiol

3. Predicate device
We claim substantial equivalence to the Enzymun-Test® Estradiol Assay (K916132).

Continued on next page

510(k) Summary, Continued

4.
Device
Description

Competition principle. Total duration of assay: 18 minutes, 37 °C.

•1st incubation (9 minutes): By incubating the sample (50 µL) with an estradiol-specific biotinylated antibody (65 µL), an immunocomplex is formed, the amount of which is dependent upon the analyte concentration in the sample.

•2nd incubation (9 minutes): After addition of streptavidin-coated microparticles (35 µL) and an estradiol derivative labeled with a ruthenium complex** (65 µL), the still-vacant sites of the biotinylated antibodies become occupied, with the formation of an antibody-hapten complex. The entire complex becomes bound to the solid phase via interaction of biotin and streptavidin.

•The reaction mixture is aspirated into the measuring cell where the microparticles are magnetically captured onto the surface of the electrode. Unbound substances are then removed with ProCell. Application of a voltage to the electrode then induces chemiluminescent emission which is measured by a photomultiplier (0.4 second read frame).

•Results are determined via a calibration curve which is instrument-specifically generated by 2-point calibration and a master curve provided via the reagent bar code.

**Tris(2,2'-bipyridyl)ruthenium(II) complex ($\text{Ru}(\text{bpy})_3^{2+}$)

5.
Intended use

Immunoassay for the in vitro quantitative determination of estradiol in human serum and plasma.

Continued on next page

510(k) Summary, Continued

6. Comparison to predicate device

The Boehringer Mannheim Elecsys® Estradiol Assay is substantially equivalent to other products in commercial distribution intended for similar use. Most notably it is substantially equivalent to the currently marketed Enzymun-Test® Estradiol Assay (K916132).

The following table compares the Elecsys® Estradiol Assay with the predicate device, Enzymun-Test® Estradiol Assay. Specific data on the performance of the test have been incorporated into the draft labeling in attachment 5. Labeling for the predicate device is provided in attachment 6.

Similarities:

- Intended Use: Immunoassay for the in vitro quantitative determination of estradiol
- Sample type: Serum and plasma
- Antibody: Same polyclonal anti-estradiol antibody
- Solid phase binding principle: Streptavidin/Biotin
- Assay Standardization: ID-GC/MS

Differences:

Feature	Elecsys® Estradiol	Enzymun® Estradiol
Reaction test principle	Electrochemiluminescence	ELISA/1-step sandwich assay.
Instrument required	Elecsys® 2010	ES 300
Calibration Stability	A calibration is recommended every 7 days if kit is not consumed; 4 weeks with same reagent lot if reagent is consumed within 7 days.	Full calibration required every 2 weeks. One-point calibration required every run.

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510(k) Summary, Continued

6. Comparison to predicate device, cont.

Performance Characteristics:

Feature	Elecsys® Estradiol			Ezymun® Estradiol		
	Modified NCCLS (pg/mL):			Modified NCCLS (pg/mL):		
Level	Low	Mid	High	Low	Mid	High
Within-Run: N	60	60	60	60	60	60
Mean	53.3	410	3021	44.0	277.6	1217.0
% CV	6.5	2.7	3.0	14.3	8.5	7.7
Total: Mean	53.3	410	3021	44.0	277.6	1217.0
% CV	9.0	5.0	5.5	16.1	9.1	10.3
Lower Detection Limit	10 pg/mL			10 pg/mL		
Linearity	10-4600 pg/mL (with a deviation from a linear line of $\pm 10\%$)			10-1300 pg/mL (with a deviation from a linear line of $\pm 10\%$)		
Method Comparison	Vs Enzymun-Test® Estradiol <u>Least Squares</u> $y = 0.902x + 42.94$ $r = 0.976$ SEE = 91.96 N = 74 <u>Passing/Bablok</u> $y = 0.962x + 12.51$ $r = 0.976$ SEE = 38.71 N = 74			Vs Enzymun-Test® Estradiol <u>Least Squares</u> $y = 1.027x + 6.32$ $r = 0.995$ SEE = 31.03 N = 64		
Interfering substances	No interference at:			No interference at:		
Bilirubin	25 mg/dL			64.5 mg/dL		
Hemoglobin	1.0 g/dL			200 mg/dL		
Lipemia	1500 mg/dL			1250 mg/dL		
Biotin	24 ng/mL			20 ng/mL		

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510(k) Summary, Continued

6.
Comparison
to predicate
device, cont.

Performance Characteristics:

Feature	Elecsys® Estradiol		Enzymun® Estradiol	
	Level tested (ng/mL)	% Cross- reactivity	Level tested	% Cross- reactivity
17 hydroxy-Progesterone	100	< 0.5	---	< 0.001
Ethisterone	100	< 0.5	---	---
Norethindrone-Acetate	100	< 0.5	---	---
2-Methoxy-estradiol	100	< 1.0	---	0.07
6-Hydroxy-estradiol	0.78	< 600	---	62
Estriol	160	< 1.0	---	0.3
Prednisolone	1000	< 0.25	---	---
Danazol	100000	< 0.1	---	0.0006
Testosterone	100000	< 1.0	---	0.03
Di-Hydro-Testosterone	100000	< 1.0	---	---
5-Androsten-3β-17β-Diol	100000	< 0.4	---	---