

SEP 25 1997

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EXHIBIT D

510(k) Summary For AquaLite® Human Growth Hormone Assay

510(k) SUMMARY

I. GENERAL INFORMATION

Trade or proprietary name - SeaLite Sciences, Inc. AquaLite® hGH Assay

Common or usual name - Bioluminescent immunoassay (BIA)

Classification name - FDA has classified human growth hormone test systems intended for the measurement of human growth hormone in the diagnosis and treatment of disorders involving the anterior lobe of the pituitary glands. Class I devices (21 C.F.R. § 862.1370)

Submitter's Name and Address: Cathryn N. Cambria
Director, Regulatory Affairs and
Quality Assurance
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Suite 200
Norcross, GA 30071
(800) 874-4471, ext. 227

Submission Date: July 23, 1997

**Legally Marketed Device
To Which Claim Substantial
Equivalence:** Nichols Institute
Human Growth Hormone Assay

II. INDICATIONS FOR USE

The AquaLite® hGH Bioluminescent Immunoassay (BIA) Kit (or the AquaLite® hGH Assay) is an *in vitro* diagnostic product intended for use in clinical laboratories for the quantitative determination of human growth hormone in serum. Human Growth Hormone measurements are used in the diagnosis and treatment of disorders involving the anterior lobe of the pituitary gland. The AquaLite® Human Growth Hormone Assay is for *in vitro* diagnostic use.

III. DEVICE DESCRIPTION

The AquaLite® hGH Bioluminescent Immunoassay Kit uses a mouse monoclonal anti-hGH antibody that is pre-coated onto polystyrene tubes (solid phase). Serum samples or appropriate calibrators or controls, are pipetted (150 µL) into the pre-coated tubes. A sheep anti-hGH antibody covalently linked to AquaLite® (100 µL) is then added to the tubes. hGH in the sample combines with the antibody on the solid phase and conjugate antibody to form an immune complex or "sandwich" bound to the solid phase. Complex formation is complete after a 120-minute incubation period at room temperature on a standard orbital shaker. The tubes are then washed to remove unbound conjugate.

The washed tubes are placed in a luminometer that is capable of reading a triggered, flash-type reaction in 12 x 75 mm tubes. Injection of the calcium trigger buffer causes AquaLite® to oxidize its self-contained luciferin molecule, producing a flash of light, which is measured by the luminometer. The intensity of the light emitted from antibody bound to the tubes is directly proportional to the concentration of the hGH in the sample. To calculate results, the light intensity (in relative light units, RLU) of the hGH calibrators is plotted against hGH concentration (in ng per mL) to yield a calibration curve. This curve is used to relate the light intensity generated from the samples and controls to hGH concentration in ng/mL.

Note: Samples that generate signals greater than the signal from the highest calibrator are off-scale. These samples must be diluted and re-assayed. Remember to multiply the results from diluted samples by the dilution factor used.

IV. SUMMARY OF STUDIES AND TECHNOLOGICAL CHARACTERISTICS

Studies on the AquaLite® hGH Assay were conducted at SeaLite Sciences. The results are summarized below:

Performance Characteristics

1. Sensitivity

The sensitivity or detection limit of the AquaLite® hGH Assay is 0.005 ng/mL. Sensitivity is determined by adding the mean signal of 20 replicates of the zero level calibrator plus two (2) standard deviations above this mean. The hGH concentration (ng/mL) associated with this calculated signal is defined as the sensitivity of the assay.

2. Specificity

The AquaLite® hGH Assay measures human growth hormone. The following human hormones were supplied by the World Health Organization's National Institute for Biological Standards and Control (London, England). Aliquots of these preparations were diluted to the following levels in human serum and assayed. Percent cross-reactivity (%) is reported below:

SUBSTANCE	WHO/NIBSC LOT NUMBER	TESTED AT	CROSS- REACTIVITY
Prolactin	3rd I.S. 84/500	500 ng/mL	0.09
		1,000 ng/mL	0.17
hPL	1st IRP 73/545	10,000 ng/mL	<0.01
		100,000 ng/mL	<0.01
LH	2nd I.S. 80/552	250 mIU/L	<0.01
		500 mIU/L	<0.01
TSH	2nd IRP 80/558	250 µIU/L	<0.01
		500 µIU/L	<0.01
hCG	3rd I.S. 75/537	10,000 mIU/L	<0.01
		50,000 mIU/L	<0.01
FSH	1st I.S. 83/575	250 mIU/L	<0.01
		500 mIU/L	<0.01

3. High Dose Hook Effect

No high dose hook effect occurs prior to 500 ng/mL.

4. Precision

- (a) **Intra-assay precision.** Three serum commercial controls containing hGH at the following concentrations were assayed to determine intra-assay precision. (Total N = 20 per concentration level.)

<u>hGH Level (ng/mL)</u>	<u>% CV</u>
3.33	4.80
6.20	4.97
12.30	6.95

- (b) **Inter-assay precision.** Commercial controls containing hGH at the following concentrations were assayed in duplicate over a period of 3 weeks. 20 assays were performed using 3 sets of calibration values. The inter-assay precision observed for the solutions (Total n = 2 x 10 = 20) are shown below.

<u>hGH Level (ng/mL)</u>	<u>% CV</u>
2.89	6.4%
5.19	9.8%
9.42	11.8%

5. Method Comparison

The AquaLite® hGH Assay was used to assay patient samples (N=60) that were previously assayed by a commercially available chemiluminescence immunoassay. The serum samples ranged from 0.5 to 20.3 ng/ml of human growth hormone. Correlation by linear regression analysis gave a slope of 1.2831 with a y-intercept of 0.146. The correlation coefficient was 0.9665.

6. Linearity and Nonparallelism

Three human serum samples containing the levels of endogenous hGH shown below were diluted as indicated using AquaLite® hGH Calibrator A and assayed in duplicate using AquaLite® hGH. All concentrations are in ng/ml.

SAMPLE ID	DILUTION FACTOR	OBSERVED (ng/mL)	hGH EXPECTED (ng/mL)	RECOVERY (%)
A	Undiluted	10.03	----	----
	1:2	4.62	5.02	92
	1:4	2.54	2.51	101
	1:8	1.27	1.25	100
B	Undiluted	6.42	----	----
	1:2	3.33	3.21	103
	1:4	1.58	1.61	98
	1:8	0.80	0.81	100
C	Undiluted	5.54	----	----
	1:2	2.76	2.77	100
	1:4	1.44	1.39	103
	1:8	0.71	0.69	103

7. **Spike and Recovery**

hGH serum samples were mixed in 2 to 1, 1 to 1, and 1 to 2 ratios and assayed in duplicate using the AquaLite® hGH Assay. All values are in ng/mL.

SAMPLE ID	DILUTION	hGH OBSERVED	hGH EXPECTED	% RECOVERED
1	Undiluted A	11.37	----	----
	2A:1B	7.23	7.89	92%
	1A:1B	6.23	6.15	101%
	1A:2B	4.56	4.41	103%
	Undiluted B	0.93	----	----
2	Undiluted C	12.24	----	----
	2C:1D	8.37	8.47	99%
	1C:1D	7.28	6.59	110%
	1C:2D	5.11	4.71	108%
	Undiluted D	0.94	----	----

V. POTENTIAL ADVERSE EFFECTS OF THE DEVICE ON HEALTH

Caution: Use Universal Precautions. No known test method can offer complete assurance that products derived from human serum are pathogen-free; therefore, handle all materials of human origin as though they were potentially infectious.

Sodium azide is used as a preservative. This preservative may react with metallic plumbing to form explosive metal azides. Flush with large volumes of water when disposing of materials containing sodium azide.

As an *in vitro* diagnostic test, there are not direct adverse effects on the health of a patient from the use of this product. However, failure of the device to perform as indicated, the contamination of reagents, the use of reagents past the labeled expiration dates, the use of improper specimens, or human error during the performance of the test may lead to erroneous results and possible improper patient management.

VI. CONCLUSIONS DRAWN FROM STUDIES

The data from the studies conducted demonstrate that the performance of SeaLite Sciences, Inc. AquaLite® hGH Assay is similar and substantially equivalent to that of other commercially available assays for hGH.



SEP 25 1997

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

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Director, Regulatory Affairs and
Quality Assurance
SeaLite Sciences, Inc.
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Norcross, Georgia 30071

Re: K972761
AquaLite® Human Growth Hormone
Regulatory Class: I
Product Code: CFL
Dated: July 23, 1997
Received: July 24, 1997

Dear Ms. Cambria:

We have reviewed your Section 510(k) notification of intent to market the device referenced above and we have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (Premarket Approval), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 895. A substantially equivalent determination assumes compliance with the Current Good Manufacturing Practice requirements, as set forth in the Quality System Regulation (QS) for Medical Devices: General regulation (21 CFR Part 820) and that, through periodic QS inspections, the Food and Drug Administration (FDA) will verify such assumptions. Failure to comply with the GMP regulation may result in regulatory action. In addition, FDA may publish further announcements concerning your device in the Federal Register. Please note: this response to your premarket notification submission does not affect any obligation you might have under sections 531 through 542 of the Act for devices under the Electronic Product Radiation Control provisions, or other Federal laws or regulations.

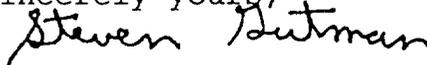
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Under the Clinical Laboratory Improvement Amendments of 1988 (CLIA-88), this device may require a CLIA complexity categorization. To determine if it does, you should contact the Centers for Disease Control and Prevention (CDC) at (770) 488-7655.

This letter will allow you to begin marketing your device as described in your 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801 and additionally 809.10 for in vitro diagnostic devices), please contact the Office of Compliance at (301) 594-4588. Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers Assistance at its toll-free number (800) 638-2041 or (301) 443-6597 or at its internet address "<http://www.fda.gov/cdrh/dsmamain.html>".

Sincerely yours,



Steven I. Gutman, M.D., M.B.A.
Director
Division of Clinical
Laboratory Devices
Office of Device Evaluation
Center for Devices and
Radiological Health

Enclosure

510(k) Number (if known): _____

Device Name: AquaLite® hGH Bioluminescent Immunoassay (BIA) Kit (or the AquaLite® hGH Assay)

Indications for Use:

The AquaLite® hGH Bioluminescent Immunoassay (BIA) Kit (or AquaLite® hGH Assay) is an *in vitro* diagnostic product intended for use in clinical laboratories for the quantitative measurement of growth hormone in human serum. Human growth hormone measurements are used in the diagnosis and treatment of disorders involving the anterior lobe of the pituitary gland.

(PLEASE DO NOT WRITE BELOW THIS LINE CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of Device Evaluation (ODE)

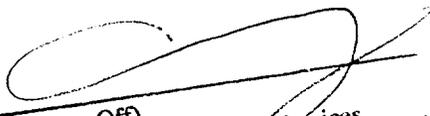
Prescription Use _____
(Per 21 CFR 801.109)

OR

Over-The-Counter Use _____

(Optional Format

1-2-96)



(Division Sign-Off)
Division of Clinical Laboratory Devices
510(k) Number 2761