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National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 6401-a
No. +++

National Institute of Advanced Industrial Science and Technology
AIST

Cortisol in Human Serum (4 Concentration Levels)

This certified reference material (CRM) was produced based on NMIJ's quality system in compliance with JIS Q 0034 (ISO GUIDE 34). This CRM is intended primarily for use in evaluating the accuracy of analytical procedures or instruments for the determination of cortisol in human serum. It is also intended for use in value assignment of secondary or working reference materials in clinical laboratory. This material may not be commutable with natural human serum in all routine cortisol analytical procedures.

Certified Value

The certified values for samples of Level 2 to 5, expressed as mass concentrations at 20 °C, are given in the following table. The expanded uncertainty was determined using coverage factor $k = 2$, corresponding to an estimated confidence interval of approximately 95 %.

	Mass concentration of cortisol	
	Certified value (μg/L)	Expanded uncertainty (μg/L)
Level 2	19.9	0.8
Level 3	46.7	1.7
Level 4	94.4	2.2
Level 5	193.0	4.0

The level 1 sample, which is coritsol removed serum, has no certified value.

Determination of Certified Value

The certified value is based on the results of isotope dilution gas chromatography-mass spectrometry (ID-GC-MS) and isotope dilution liquid chromatography tandem mass spectrometry (ID-LC-MS/MS). Mass concentration was calculated from obtained mass fraction of cortisol and density of the material.

Traceability

Each certified value was determined by isotope dilution mass spectrometry as a primary method of measurement. The calibration solution for the measurements was prepared with certified reference material (NMIJ CRM 6007-a hydrocortisone),. The certified values are traceable to the International System of Units (SI).

Stability

The material is kept at −80 ºC for long-term storage at NMIJ. Under these conditions, the cortisol is expected to be stable. NMIJ will continue to monitor the stability of the cortisol in this material. The certification of this CRM is valid until March 31, 2012 at the storage condition above.

Expiration of Distributed CRM

The expiration of the distributed CRM stored at -20 ºC is in two weeks after sample arrival.

Sample Form

The form of this CRM is yellow liquid. 0.5 mL of the each material was bottled in the vial, and a set of 5 materials was kept in

an aluminum-laminated bag.

Homogeneity

The homogeneity of the CRM was measured by ID-LC-MS/MS, analyzing 10 vials selected from 200 vials. The homogeneity is reflected in the uncertainty of the certified value.

Storage

The serum is shipped frozen (on dry ice) and, upon receipt, should be stored below - 20 ºC until ready for use. Do not use the CRM if it was already thawed on arrival.

NOTICE AND WARNINGS TO USERS

NMIJ CRM 6401 IS INTENDED FOR IN-VITRO LABORATORY USE ONLY. THIS IS A HUMAN SOURCE MATERIAL. HANDLE PRODUCT AS A BIOHAZARDOUS MATERIAL CAPABLE OF TRANSMITTING INFECTIOUS DISEASE. The supplier of this material has reported that serum material used in the preparation of this product has been tested and found non-reactive/negative forhepatitis B surface antigen, hepatitis C virus, and human immunodeficiency virus antigen. However, no known test method can offer complete assurance that hepatitis B virus, hepatitis C virus, HIV, or other infectious agents are absent from this material. Accordingly, this human blood-based product should be handled at higher as recommended for any POTENTIALLY INFECTIOUS HUMAN SERUM.

Instruction for Use

At about one hour prior to use, the CRM to be analyzed should be removed from the freezer and allowed to stand at room temperature (20 °C to 25 °C) until thawed. After confirming the cap of the vial is tightly closed, the vial is turned upside down gently several times for complete mixing. Thawed material should be used immediately. Storage of thawed material may result in changes in the cortisol concentrations.

Preparation Method

This CRM was prepared by Reference Material Institute for Clinical Chemistry Standards (Kanagawa, Japan). The serum material used was processed according to Clinical Laboratory Standards Institute (CLSI) Publication C37-A [1]. Serum samples of suitable concentrations of cortisol were prepared by mixing the serum from which cortisol was removed by charcoal treatment with the untreated serum. For the sample of level 5, a small amount of cortisol in ethanol was added to the untreated serum.

[1]"Preparation and Validation of Commutable Frozen Human Serum Pools as Secondary Reference Materials for Cholesterol Measurement Procedures; Approved Guideline", NCCLS Publication C37-A, Clinical Laboratory Standard Institute.

Information

The density of this CRM is 1.0239 g/mL (level 1 to 5) at 20 ºC.
The mass concentration of cortisol in level 1 at the certification period is given in the following table.

	Mass concentration of cortisol	
	Value (μg/L)	Expanded uncertainty (μg/L)
Level 1	0.19	0.03

NMIJ Analysts

The technical manager for this CRM is A. Takatsu, and production manager is M. Kawaguchi and the analysts are M. Kawaguchi, S. Eyama, M. Goto, K. Ishikawa and S. Otsuka.

Technical Information

Customers will be notified in the case of important revision, such as a change in the certified values. Technical information about this CRM can be obtained from the contact shown below.

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Reproduction of Certificate

In reproducing this certificate, it should be clearly indicated that the document is a copy.

December 8, 2009

Tamotsu Nomakuchi
President
National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact
National Institute of Advanced Industrial Science and Technology,
National Metrology Institute of Japan,
Metrology Management Center, Reference Materials Office,
1-1-1, Umezono, Tsukuba, Ibaraki 305-8563, Japan
Phone: +81-29-861-4059; Fax: +81-29-861-4009, http://www.nmij.jp/

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