

ANALYSIS IN BLOOD OF GOLDEN HAMSTER BY NAA FOR CLINICAL PRATICE

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In the present study Neutron Activation Analysis (NAA) technique has been used to determine, simultaneously, some element concentrations of clinical relevance in whole blood samples of Golden Hamster. The knowledge of these values permits to perform clinical investigation in this animal model using whole blood as well as to check the similarities with human blood estimation.

Keywords: Golden Hamster, blood, NAA, reference value

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INTRODUCTION

Animal experimentation is used in many research areas, mainly those related to life sciences. Particularly, in the health area, small-sized animals are currently used on investigations for new medicines and vaccines, as well as for medical diagnostic studies, before to be tested in human being. One of the commonly used animals is the Golden Hamster due its low cost and also for animal rights implications. In this study the NAA technique was used to determine the element concentrations, in whole blood samples of Golden Hamster. The elements Br, CL, K and Na were selected because they are very useful for clinical practice.

EXPERIMENTAL PROCEDURE

For this study we collected whole blood samples of 7 adult females and 13 adult males Golden Hamster (*Mesocricetus Auratus*). Less than 0.1 ml of whole blood was collected from each animal and aliquots of 100 μ L (in duplicate) were immediately transferred to the filter paper and dried for a few minutes using an infrared lamp. To determine the concentration of the elements in the biological samples the Instrumental NAA technique was applied. The precision and the accuracy of the results were checked by analysis of the reference material NIST 8414 Bovine Muscle Powder. The samples and standards were irradiated in the IEA-R1 nuclear reactor at IPEN/SP (IEA-R1, 2-4MW, pool type), for four minutes. The element concentrations were obtained using the in- house software package.

RESULTS AND DISCUSSION

The concentration of the Br, Cl, K and Na in whole blood samples of Golden Hamster are shown in Table I. All of the results are a mean of duplicate analyses. The reference interval considering 2σ (Standard deviation), the minimum and, the maximum values were also presented. The range for human whole blood estimation was also included for comparison.

Table 1. The Concentration of Br, Cl, K and Na in whole blood of Golden Hamster.

Elements	Mean (g L ⁻¹)	Minimum Value (g L ⁻¹)	Maximum Value (g L ⁻¹)	Reference Interval (g L ⁻¹)
Br	0.022 ± 0.002	0.012	0.036	0.008 – 0.036 < 0.0132 *
Cl	3.28 ± 0.16	2.19	4.25	2.14 – 4.42 2.01 – 3.33 *
K	2.32 ± 0.16	1.69	3.33	1.44 – 3.20 0.87 – 1.75 *
Na	2.02 ± 0.11	1.23	2.98	1.18 – 2.86 1.06 – 1.78 *

* Reference Interval for humans (considering $\pm 2\sigma$) [1].

Considering a confidence interval of 95%, usually adopted as references for clinical practice, the mean value for Br, Cl, K and Na for Golden Hamster are in agreement with human being whole blood estimation [1], suggesting no physiologic differences. However, the high Br and K levels suggest that these elements must be constantly evaluated during investigations using this animal model.

CONCLUSION

The NAA technique can be an alternative procedure for chemistry clinical when small quantities of biological material is available. The knowledge of concentrations and their comparison with the results from human being whole blood estimates allows for verification of the similarities or physiologic differences. Besides, these results contribute to applications in veterinary medicine related to clinical analyses using whole blood.

REFERENCE

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