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Biological evaluation of medical devices

Part 55: Interlaboratory study on cytotoxicity

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National foreword

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Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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This document was prepared by Technical Committee ISO/TC 194, *Biological and clinical evaluation of medical devices*.

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Introduction

The first edition of ISO 10993-5, published in 1992, allowed several different ways to assess cytotoxicity of medical devices and gave an imprecise description of how to perform the tests. Qualitative assays were accepted and only a small amount of guidance was given for the interpretation of the results. Not surprisingly, the first interlaboratory study in 2000 resulted in quite low reproducibility of results. Therefore, detailed protocols were included into the standard and in another study the practicability of the protocols and reference materials were evaluated. The results of this second interlaboratory study mainly influenced the revision of ISO 10993-5, which was published in 2009.

This document provides the historical report of the second interlaboratory study, conducted in 2006.

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TECHNICAL REPORT **ISO/TR 10993-55:2023**

Biological evaluation of medical devices —

Part 55: Interlaboratory study on cytotoxicity

1 Scope

This document describes the results of an international interlaboratory study conducted in 2006 to evaluate the performance of two different test protocols in terms of the cytotoxic effects in the biological evaluation of medical devices. The results of these tests were used for the revision of ISO 10993-5.[2] Furthermore, the results of these tests were used to estimate the accuracy of these test systems with living cells to define a threshold what is considered a cytotoxic effect.

NOTE The determination of cytotoxic effects has a high relevance in the biological evaluation of medical devices; according to ISO 10993-1[1], it is one of the very few tests which are proposed to be performed for every kind of device.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Participants

Twelve laboratories participated in this study[1)]. Eleven reports on a neutral red uptake (NRU) assay and ten reports on a colony formation assay (CFA) were received. Four participants were commercial test laboratories, four participants were internal test laboratories of medical device manufacturers and four laboratories were in research institutes.

The laboratories were located in six different countries: one each in Austria, France and the Netherlands, and three each in Germany, Japan and the United States.

5 Materials and sample preparation

The following materials were used for the study:

a) reference material-C [RM-C; Hatano Research Institute (HRI)]: high density polyethylene sheet;

b) RM-A (HRI): segmented polyurethane film containing 0,1 % zinc diethyldithiocarbamate (ZDEC);

1) The participating laboratories were: Deutsche Institute für Textil- und Faserforschung, Germany; Hatano Research Institute, Food and Drug Safety Center, Japan; Medical University Vienna, Austria; National Institute of Health Sciences, Japan; Envigo CRS GmbH, Germany; Terumo Corporation R&D, Japan; BD Technologies, United States; NAMSA, United States; Gambro BCT, United States and three other laboratories.

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