### WHO Technical Report Series

941

**BIOLOGICAL STANDARDIZATION** 

**Fifty-sixth Report** 

WHO Technical Report Series 941



**WHO EXPERT COMMITTEE** 

This report presents the recommendations of a WHO Expert Committee commissioned to coordinate activities leading to the adoption of international recommendations for the production and control of vaccines and other biologicals and the establishment of international biological reference materials.

The report starts with a discussion of general issues brought to the attention of the Committee and provides information on the status and development of reference materials for various antibodies, antigens, blood products and related substances, cytokines, growth factors, and endocrinological substances. The second part of the report, of particular relevance to manufacturers and national regulatory authorities, contains guidelines on guality, safety and efficacy of live attenuated rotavirus vaccines; DNA vaccines; a biosafety risk assessment for production and quality control of human influenza pandemic vaccines; recommendations for inactivated rabies vaccines produced in cell substrates and embryonated eggs; for whole cell pertussis vaccine; and for production, control and regulation of human plasma for fractionation.

Also included are a list of recommendations, guidelines and other documents for biological substances used in medicine, and of international standards and reference reagent for biological substances.





Geneva

The World Health Organization was established in 1948 as a specialized agency of the United Nations serving as the directing and coordinating authority for international health matters and public health. One of WHO's constitutional functions is to provide objective and reliable information and advice in the field of human health, a responsibility that it fulfils in part through its extensive programme of publications.

The Organization seeks through its publications to support national health strategies and address the most pressing public health concerns of populations around the world. To respond to the needs of Member States at all levels of development, WHO publishes practical manuals, handbooks and training material for specific categories of health workers; internationally applicable guide-lines and standards; reviews and analyses of health policies, programmes and research; and state-of-the-art consensus reports that offer technical advice and recommendations for decision-makers. These books are closely tied to the Organization's priority activities, encompassing disease prevention and control, the development of equitable health systems based on primary health care, and health promotion for individuals and communities. Progress towards better health for all also demands the global dissemination and exchange of informa-tion that draws on the knowledge and experience of all WHO's Member coun-tries and the collaboration of world leaders in public health and the biomedical sciences.

To ensure the widest possible availability of authoritative information and guidance on health matters, WHO secures the broad international distribution of its publications and encourages their translation and adaptation. By helping to promote and protect health and prevent and control disease throughout the world, WHO's books contribute to achieving the Organization's principal objec-tive — the attainment by all people of the highest possible level of health

## SELECTED WHO PUBLICATIONS OF RELATED INTEREST

WHO Expert Committee on Biological Standardization Fifty-fifth report. WHO Technical Report Series, No. 932, 2006 (137 pages) web site www.who.int/biologicals

**WHO Expert Committee on Biological Standardization** Fifty-fourth report. WHO Technical Report Series, No. 927, 2005 (154 pages)

**WHO Expert Committee on Biological Standardization** Fifty-third report. WHO Technical Report Series, No. 926, 2004 (109 pages)

**WHO Expert Committee on Biological Standardization** Fifty-second report. WHO Technical Report Series, No. 924, 2004 (234 pages)

Further information on these or other WHO publications can be obtained from Marketing and Dissemination, World Health Organization, 1211 Geneva 27, Switzerland

*The WHO Technical Report Series* makes available the findings of various international groups of experts that provide WHO with the latest scientific and technical advice on a broad range of medical and public health subjects. Members of such expert groups serve without remuneration in their personal capacities rather than as representatives of governments or other bodies; their views do not necessarily reflect the decisions or the stated policy of WHO. An annual subscription to this series, comprising about six such reports, costs Sw. fr. 132.– or US\$ 106.– (Sw. fr. 92.40 in developing countries). For further information, please contact Marketing and Dissemination, World Health Organization, 20 avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 2476; fax: +41 22 791 4857; e-mail: bookorders@who.int).

This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization

WHO Technical Report Series

941

# WHO EXPERT COMMITTEE ON BIOLOGICAL STANDARDIZATION

Fifty-sixth Report



Geneva 2007

WHO Library Cataloguing-in-Publication Data

WHO Expert Committee on Biological Standardization. Meeting (2007: Geneva, Switzerland) Fifty-sixth report/WHO Expert Committee on Biological Standardization.

(WHO technical report series ; no. 941)

Biological products - standards. 2. Vaccines - standards. 3. Reference standards.
Guidelines. I. World Health Organization. II. Series.

ISBN 92 4 120941 0 ISBN 978 92 4 120941 0 ISSN 0512-3054 (NLM classification: QW 800)

#### © World Health Organization 2007

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications — whether for sale or for noncommercial distribution — should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

This publication contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization.

Typeset in Switzerland. Printed in Singapore.

## Contents

Introduction	1
Opening remarks by Secretary of the Expert Committee	2
General	2
Developments in biological standardization	2
WHO programmatic issues	2
Vaccines and biological therapeutic products	4
Maintenance of capacity for production of MCR-5 human diploid	
fibroblast cells	6
Blood products and related in vitro diagnostic devices (IVDs)	8
Advancement of technical expertise of regulatory authorities in the area	
of blood products and IVDs	10
Quality, safety and efficacy of animal plasma-derived antisera	10
Global needs in standardization of products derived by biotechnology	12
International Non-proprietary Names for gene therapy products	13
Reports from the WHO International Laboratories and	
WHO Collaborating Centres	14
Feedback from users of WHO biological standardization products	19
International guidelines, recommendations and other matters related	
to the manufacture and quality control of biologicals	20
Guidelines for assuring the quality and nonclinical safety evaluation	
of DNA vaccines	20
Recommendations for rabies vaccines	21
Guidelines to assure the quality, safety and efficacy of live attenuated	
rotavirus vaccines (oral)	22
WHO Biosafety guidelines for the production and quality control of	
human influenza pandemic vaccine strains	23
Recommendations for whole cell pertussis vaccines	24
Recommendations for the production, control and regulation of human	
plasma for fractionation	25
WHO guidelines on transmissible spongiform encephalopathies	
in relation to biological and pharmaceutical products	25
Guidelines to assure the quality, safety and efficacy of human cells	
and tissues for transplantation	27
Guidelines for good manufacturing practice for biological products	29
Guidelines for good manufacturing practice for blood	
establishments	30
Stability of vaccines	31
Flavivirus vaccines — regulatory expectations	32
Guidelines for acellular pertussis vaccines	33
Recommendations for bacille Calmette-Guérin vaccines	34
International reference materials	35
Proposals for discontinuation of reference preparations	35

Antigens and related substances	36
Yellow fever vaccine — minimum specifications in International Units	
per 0.5 ml dose	36
Smallpox vaccine — stability studies	37
Poliovirus, Sabin type 3 — neurovirulence test reference	38
Haemophilus influenzae type b capsular polysaccharide	39
Antisera	40
Dengue virus antibody, human serum	40
Japanese encephalitis virus, human serum	41
Anti-human platelet antigen-1a	42
	12
Blood products and related substances	43
World Health Organization/International Society of Thrombosis	
and Haemostasis Liaison Committee report	43
Anti-A and anti-B blood grouping reagents	44
Prothrombin mutation	46
Vitamin B12 and folate in human serum	47
Blood coagulation factor V (plasma) human	47
Blood coagulation factor XI (plasma) human	48
Thromboplastin, rabbit, plain	49
Cytokines, growth factors and endocrinological substances	49
Vascular endothelial growth factor	49
Keratinocyte growth factor	40 50
	50
Measurement of relative potencies of thermal degradation samples	51
of the WHO international standard of interferon alpha 2b	51
Diagnostic reagents	53
Reference materials for in vitro diagnostic devices	53
HIV-1 RNA nucleic acid amplification test	53
Anti-HIV tests	54
Annex 1	
Guidelines for assuring the quality and non-clinical safety evaluation	
of DNA vaccines	57
Annex 2	
Recommendations for inactivated rabies vaccine for human use	
produced in cell substrates and embryonated eggs	83
Annex 3 Cuidelines to secure the sublity selecty and efficiency of live attenuated	
Guidelines to assure the quality, safety and efficacy of live attenuated	100
rotavirus vaccines (oral)	133
Annex 4	
Recommendations for the production. control and regulation of human	
plasma for fractionation	189

Annex 5 WHO biosafety risk assessment and guidelines for the production	
and quality control of human influenza pandemic vaccines	265
Annex 6	001
Recommendations for whole cell pertussis vaccine	301
Annex 7 Biological Substances: international standards and reference reagents	335
Annex 8	
Recommendations, guidelines and other documents for biological substances	
used in medicine	337



https://www.yunbaogao.cn/report/inde