WHO International Standard
5th International Standard 2016
Thromboplastin, Rabbit, Plain
NIBSC code: RBT/16
Instructions for use
(Version 3.0, Dated 24/10/2016)

1. INTENDED USE
This standard is used for the ISI calibration of rabbit thromboplastin reagents. The standard was established as the WHO 5th International
Standard for Thromboplastin Rabbit, Plain by the WHO Expert Committee
on Biological Standardization (ECBS) in 2016 and consists of ampoules
containing lyophilised rabbit brain thromboplastin reagent (coded 15/314)
and ampoules of diluent for reconstitution (coded 15/316). Details of the
collaborative study can be found in document WHO/BS/2016.2294.

THIS STANDARD MUST BE RECONSTITUTED USING THE DILUENT
(15/316) PROVIDED.

2. CAUTION
This preparation is not for administration to humans or animals in
the human food chain.

The preparation consists of a tissue extract from rabbit brain which
contains tissue factor and phospholipids; it does not contain material
of human origin. As with all materials of biological origin, this preparation
should be regarded as potentially hazardous to health. It should be
used and discarded according to your own laboratory’s safety
procedures. Such safety procedures should include the wearing of
protective gloves and avoiding the generation of aerosols. Care
should be exercised in opening ampoules or vials, to avoid cuts.

3. UNITAGE
The International Standard has been assigned an ISI value of 1.21

The ISI value was determined in a collaborative study against the two
available WHO International Standards for human (rTF/09) and rabbit
(RBT/05) thromboplastin. The collaborative study involved 20 laboratories
from Europe, Canada, South America, Australia and Asia. RBT/16 and the
two WHO International Standards from human and rabbit origin
(rTF/09 and RBT/05) were tested in each laboratory by the same expert
operator with the manual (tilt tube) technique. Test plasmas were freshly
prepared from healthy subjects and patients stabilized on long term oral
anticoagulant therapy. Participants were instructed to select patient
plasmas with PT corresponding to an interval of INR from 1.5 to 4.5. To
account for the effect of inter-day variation, PT measurements were
performed in each laboratory on ten different days (not necessarily
consecutive). Participants were instructed to include on each day plasmas
from 2 healthy individuals and 6 anticoagulated patients. Healthy subjects
and patients had to be different on each working day. To minimize the
effect of plasma instability on the relationship between the
thromboplastins, the order of testing was changed each day. Each plasma
was to be tested with each thromboplastin before proceeding to the next.
Plasmas were tested on each day according to the following order:

normal plasma 1, patient plasma 1 through 6, normal plasma 2

4. CONTENTS
Country of origin of biological material: United States of America.
THROMBOPLASTIN REAGENT (lyophilised portion coded 15/314)
was supplied by a manufacturer of commercial reagent and consists of a
buffered tissue extract from rabbit brain which contains tissue factor with
phospholipids, a stabilizer and a heparin neutralizing reagent (polybrene)

DILUENT FOR RECONSTITUTION (coded 15/316) A liquid preparation
which contains: calcium chloride, stabilizers, buffer and a preservative
(sodium azide, 0.1%).

5. STORAGE
Unopened ampoules of lyophilised RBT/16 reagent (15/314) should be
stored in the dark at -20 °C or below. Unopened ampoules of the diluent
(15/316) should be stored in the dark between 2 to 8 °C - do not freeze.

Please note: NIBSC may ship these materials with cooling packs to
ensure stability in transit.

6. DIRECTIONS FOR OPENING
DIN ampoules have an 'easy-open' coloured stress point, where the
narrow ampoule stem joins the wider ampoule body.

Tap the ampoule gently to collect the material at the bottom (labeled)
end. Ensure that the disposable ampoule safety breaker provided is
pushed down on the stem of the ampoule and against the shoulder of the
ampoule body. Hold the body of the ampoule in one hand and the
disposable ampoule breaker covering the ampoule stem between the
thumb and first finger of the other hand. Apply a bending force to open
the ampoule at the coloured stress point, primarily using the hand holding
the plastic collar.

Care should be taken to avoid cuts and projectile glass fragments that
might enter the eyes, for example, by the use of suitable gloves and an
eye shield. Take care that no material is lost from the ampoule and no
glass falls into the ampoule. Within the ampoule is dry nitrogen gas at
slightly less than atmospheric pressure. A new disposable ampoule
breaker is provided with each DIN ampoule.

7. USE OF MATERIAL
No attempt should be made to weigh out any portion of the freeze-dried
material prior to reconstitution

Equilibrate ampoules at room temperature for at least 15 minutes before
reconstitution. Each ampoule of the lyophilised RBT/16 reagent (15/314) is
to be reconstituted with exactly 1.0 ml of the provided diluent (coded 15/316).

Leave the ampoule undisturbed for 30 minutes at room temperature and
then swirl gently to dissolve the content. Pool the contents of ampoules
if more than one is needed to complete one calibration session. Leave
thromboplastin at room temperature and use the material within 4 hours of
reconstitution. This thromboplastin contains calcium chloride.

CALIBRATION PROCEDURE TO BE USED WITH RBT/16

According to the WHO Guidelines (1) full calibration of thromboplastins
should be performed on plasmas from 20 healthy subjects and 60 patients
on stabilized oral anticoagulant therapy. The whole calibration procedure
can be conveniently split into five or more working sessions, not necessarily
consecutive.

Schedule of one-day calibration

During the first 2 hours collect the blood, centrifuge and separate the
plasma and reconstitute thromboplastins according to the instructions.
During the next 2-3 hours perform the actual testing of plasmas according to
the design provided (see below).

Selection of healthy subjects and patients

Healthy subjects must be ambulant adults (females taking oral
contraceptives can be included). On each working day use one male and
one female (if it is possible) and take a different pair each day.

Patients must be different on each day and chosen among those who are in
good health (outpatients) and have been stabilized for at least 6 weeks in the
range of treatment between 1.5 and 4.5 INR, according to the routine
reagent of the laboratory. Select patients covering the whole range of
anticoagulation from 1.5 to 4.5. To avoid bias all results obtained with the
chosen patients must be recorded.

Blood collection and plasma preparation

At the beginning of each working day collect blood from 2-4 healthy subjects
and 6-12 patients stabilized on oral anticoagulant treatment. Blood will be
collected by clean venipuncture in a plastic (or glass siliconized vacuum) tube containing trisodium citrate solution within the range of concentration 105-109 mmol/L (9 volumes of blood/1 volume of sodium citrate anticoagulant). The tube must be inverted several times to ensure complete mixing of blood and anticoagulant. Citrated blood will be centrifuged immediately after collection at least 2,500g for 10 minutes at a controlled room temperature. Plasma will be transferred into plastic tubes and stored capped at room temperature, until testing

Preparation of thromboplastins

On each working day:

- Equilibrate a suitable number of ampoules of lyophilised RBT/16 reagent (15/314) and the provided diluent (15/316) at room temperature for at least 15 minutes before reconstitution.
- Equilibrate a suitable number of ampoules of thromboplastin to be calibrated and its reconstitution fluid (if any) at room temperature for at least 15 minutes before reconstitution.
- Reconstitute ampoules of lyophilised RBT/16 reagent (15/314) following instructions (see sections 6 and 7 above).
- Reconstitute ampoules of thromboplastin to be calibrated following instructions. Note: Discard the remaining reconstituted thromboplastins at the end of each working day

Testing procedure

If testing is performed on 10 working sessions, the following procedure is used on each session. Test the 8 plasma samples (2 normal and 6 patients stabilized on oral anticoagulant therapy) (1) and the 8 thromboplastins according to the design given below. Testing must be done as single determinations. Testing with RBT/16 must be performed exclusively by using manual (tilt tube) technique, whereas a coagulometer may be used for testing with the thromboplastin to be calibrated. With the tilt tube technique, test tubes must be immersed in the water as deeply as possible to ensure optimal temperature control. Tilt the tubes back and forth at regular intervals. To avoid prolonged removal of tubes from the water, the use of an illuminated water-bath is recommended. The order of testing normal and patient plasmas will be random and must reflect the order of blood collection if this is considered random. As an example collect first the normal 1 (which will be tested first) then the 6 patients on oral anticoagulant treatment and finally the normal 2 (which will be tested last). In any case the order of testing should not be related to the prolongation of the clotting time of the patient plasma. The order of testing on each working day shall be as follows:

Normal 1  Patient 1  Patient 2  Patient 3  Patient 4  Patient 5  Patient 6  Normal 2

If the calibration is performed on five working sessions, the number of samples used in each session is 16 (4 normal and 12 patients). The order of testing on each working day shall be as follows:

Normal 1, Normal 2, Patient 1 - 12, Normal 3, Normal 4

Each plasma shall be tested with both thromboplastins before proceeding to the next if both are used with the manual technique. If the prothrombin time system to be calibrated involves the use of an automated instrument, it is not practical to test each plasma with both thromboplastins before proceeding to the next. In that case, all plasmas can be tested with each thromboplastin consecutively and more or less simultaneously with both thromboplastins. The same expert operator shall be in charge to carry out the whole calibration.

Actual testing with RBT/16

Place glass test tubes in the water bath and wait at least 5 minutes to reach 37°C. Pipette 0.2 ml RBT/16 into glass tube at 37°C and incubate for 2 minutes.

Pipette 0.1 ml not pre-warmed test plasma and start a stopwatch immediately.

Shake to mix the content and tilt the tube regularly back and forth until clot forms.

Record the clotting time in seconds and 1/10 seconds.

Equipment

Calibrated pipettes to reconstitute thromboplastins and to deliver thromboplastin and plasma samples for actual testing. If automated micropipettes are used, tips must be changed for each test.

Non-contact tubes with non-contact stoppers (no rubber) to store blood and plasma.

Non-contact pipettes to transfer plasmas for storage and to dispense plasmas for testing.

Glass tubes for testing.

Water bath thermostatted at 37°C +/- 0.5.

Stopwatches

Statistical analysis and ISI determination

For statistical analysis and ISI determination refer to the WHO Guidelines for thromboplastins and plasma used to control oral anticoagulant therapy (1).

8. STABILITY

Reference materials are held at NIBSC within assured temperature-controlled storage facilities and they should be stored on receipt as indicated on the label. It is the policy of WHO not to assign an expiry date to their international reference materials. Stability studies have indicated that this material is suitable for shipping without cooling packs for periods up to 1 year. The material is reasonably stable for shipment with cooling packs without any effect on the assigned values. Users who have data supporting any deterioration in the characteristics of any reference preparation are encouraged to contact NIBSC.

9. REFERENCES


10. ACKNOWLEDGEMENTS

Grateful acknowledgements are due to the participants in the collaborative study and to Instrumentation Laboratory (Orangeburg, NY) and Technoclone GmbH (Vienna, Austria), who donated the candidate materials and control samples for the collaborative study.

11. FURTHER INFORMATION

Further information can be obtained as follows:

Materials: enquiries@nibsc.org

WHO Biological Standards:

http://www.who.int/biologicals/en/

JCTLM Higher order reference materials:

http://www.bipm.org/en/committees/jc/jctlm/

Derivation of International Units:

http://www.nibsc.org/standardisation/international_standards.aspx

Ordering standards from NIBSC:

http://www.nibsc.org/products/ordering.aspx

NIBSC Terms & Conditions:

http://www.nibsc.org/terms_and_conditions.aspx

12. CUSTOMER FEEDBACK

Customers are encouraged to provide feedback on the suitability or use of the material provided or other aspects of our service. Please send any comments to enquiries@nibsc.org
13. CITATION
In all publications, including data sheets, in which this material is referenced, it is important that the preparation’s title, its status, the NIBSC code number, and the name and address of NIBSC are cited and cited correctly.

14. MATERIAL SAFETY SHEET
Classification in accordance with Directive 2000/54/EC, Regulation (EC) No 1272/2008: Not applicable or not classified

<table>
<thead>
<tr>
<th>Physical and Chemical properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical appearance: Freeze-dried powder</td>
<td>Corrosive: No</td>
</tr>
<tr>
<td>Stable: Yes</td>
<td>Oxidising: No</td>
</tr>
<tr>
<td>Hygroscopic: Yes</td>
<td>Irritant: No</td>
</tr>
<tr>
<td>Flammable: No</td>
<td>Handling: See caution, Section 2</td>
</tr>
<tr>
<td>Other (specify): Material extracted from rabbit brain</td>
<td></td>
</tr>
</tbody>
</table>

Toxicological properties

| Effects of inhalation: | Not established, avoid inhalation |
| Effects of ingestion: | Not established, avoid ingestion |
| Effects of skin absorption: | Not established, avoid contact with skin |

Suggested First Aid

Inhalation: Seek medical advice
Ingestion: Seek medical advice
Contact with eyes: Wash with copious amounts of water. Seek medical advice
Contact with skin: Wash thoroughly with water.

Action on Spillage and Method of Disposal

Spillage of ampoule contents should be taken up with absorbent material wetted with an appropriate disinfectant. Rinse area with an appropriate disinfectant followed by water. Absorbent materials used to treat spillage should be treated as biological waste.

15. LIABILITY AND LOSS
In the event that this document is translated into another language, the English language version shall prevail in the event of any inconsistencies between the documents.

Unless expressly stated otherwise by NIBSC, NIBSC’s Standard Terms and Conditions for the Supply of Materials (available at http://www.nibsc.org/About_Us/Terms_and_Conditions.aspx or upon request by the Recipient) (“Conditions”) apply to the exclusion of all other terms and are hereby incorporated into this document by reference. The Recipient’s attention is drawn in particular to the provisions of clause 11 of the Conditions.

16. INFORMATION FOR CUSTOMS USE ONLY

| Country of origin for customs purposes*: United Kingdom |

* Defined as the country where the goods have been produced and/or sufficiently processed to be classed as originating from the country of supply, for example a change of state such as freeze-drying.

| Net weight: 0.100 g |

| Toxicity Statement: Non-toxic |

| Veterinary certificate or other statement if applicable. Attached: No |

17. CERTIFICATE OF ANALYSIS

NIBSC does not provide a Certificate of Analysis for WHO Biological Reference Materials because they are internationally recognised primary reference materials fully described in the instructions for use. The reference materials are established according to the WHO Recommendations for the preparation, characterization and establishment of international and other biological reference standards http://www.who.int/bloodproducts/publications/TRS932Annex2_Inter_biol_eftstandardsrev2004.pdf (revised 2004). They are officially endorsed by the WHO Expert Committee on Biological Standardization (ECBS) based on the report of the international collaborative study which established their suitability for the intended use.