



Instructions for Use

ACHRAB Ganglionic Assay RIA

¹²⁵I-Radio Immuno Assay
for the Quantitative Determination of
Ganglionic Acetylcholine Receptor Autoantibodies
in Human Serum

RUO


Item No. RA122/25



25











2 – 8 °C

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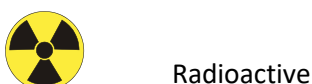
Contents

1. Introduction and Principle of the Test	3
2. Precautions	4
3. Storage and Stability	4
4. Contents of the Kit	5
5. Specimen Collection and Storage	6
6. Preparation of Samples and Reagents	6
7. Test Procedure	7
8. Calculation of Results	8
9. Assay Characteristics	10
10. Modifications of Instructions for Use	11
11. Literature	11
Pipetting Scheme	12

Symbols

	Research Use Only		
	Content		Expiry Date
	Lot Number		Store at
	Manufactured by		Sufficient for ... determinations
Item No.	Catalogue number		Consult Instructions for Use

Hazard Pictograms



1. Introduction and Principle of the Test

The ACHRAB Ganglionic Assay RIA kit is for the quantitative determination of Ganglionic Acetylcholine Receptor (gAChR) Autoantibodies (Abs) in human serum. The assay is intended for use by professional persons only and for research use only. Not for use in diagnostic procedures.

Serum autoantibodies reactive with gAChR are implicated in impaired synaptic transmission at autonomic ganglia, specifically associated with Autoimmune Autonomic Ganglionopathy (AAG) and gastro-intestinal dysmotility. Functional gAChRs are pentameric, consisting of $\alpha 3$ and $\beta 4$ subunits and are expressed predominately in autonomic ganglia. gAChR Abs primarily bind to the $\alpha 3$ -subunit. The kit is easy to use and provides a specific and sensitive assay for gAChR Ab.

The assay depends on the use of recombinant gAChR complexed with ^{125}I -labelled epibatidine. The ^{125}I -labelled gAChRs are incubated with test sera and the resulting complexes immunoprecipitated with anti-human IgG. The higher the concentration of autoantibody, the greater the amount of radioactivity precipitated.

2. Precautions

This kit is intended for *in vitro* use by professional persons only. Follow the instructions carefully. Refer to Safety Data Sheet for more detailed safety information. The kit contains radioactive material. Users should make themselves aware of, and observe, any national and local legislation and codes of practice governing the use, storage, transportation and disposal of radioactive materials. It must not be administered to humans or animals under any circumstances. Avoid all actions likely to lead to ingestion; do not eat, drink or smoke where radioactive materials are being handled. Do not pipet by mouth. Avoid contact with skin and clothing. Wear protective clothing, disposable gloves, and, where appropriate, personal dosimeters. Radioactive materials should only be used by authorised personnel and in designated areas. Wash hands thoroughly after handling. Monitor hands and clothing before leaving the designated area. Materials of human origin used in the preparation of the kit have been tested and found non-reactive for HIV1 and 2 and HCV antibodies and HBsAg but should, none-the-less, be handled as potentially infectious. Wash hands thoroughly if contamination has occurred and before leaving the laboratory. Sterilise all potentially contaminated waste, including test specimens, before disposal. Materials of animal origin used in the preparation of the kit have been obtained from animals certified as healthy but these materials should be handled as potentially infectious. Some components contain small quantities of sodium azide as preservative. With all kit components, avoid ingestion, inhalation, injection or contact with skin, eyes or clothing. Avoid formation of heavy metal azides in the drainage system by flushing any kit component away with copious amounts of water.


3. Storage and Stability

On arrival, store the kit at 2-8 °C. Once opened the kit is stable until its expiry date. For stability of prepared reagents refer to Preparation of Reagents.

Do not use components beyond the expiration date shown on the kit labels.

Do not mix various lots of any kit component within an individual assay.

4. Contents of the Kit

¹²⁵I-labelled gAChR	¹²⁵I labelled gAChR		2 vials
lyophilized, activity < 6 kBq/vial at manufacture			
Negative Control	Control -		1 vial
0.1 ml, ready for use			
Positive Controls 1 & 2	Control + I	Control + II	2 vials
0.1 ml each, ready for use, for concentration ranges see QC Certificate			
Anti-human IgG	Anti Human IgG		1 vial
2 ml, ready for use			
Reconstitution Buffer	Reconstitution Buffer		1 bottle
2 ml, ready for use for reconstitution of ¹²⁵ I-labelled gAChR			
Wash Solution	Wash Solution		1 bottle
60 ml, ready for use, Keep at 2-8°C except when in use			

Additional materials and equipment required but not provided:

- Pipettes for dispensing 10 µl, 50 µl, 0.75 ml and 1 ml
- 4.5 ml conical plastic tubes and suitable rack
- Centrifuge capable of 2-8 °C and 1500 x g
- Suitable device for aspirating or decanting the supernatant
- Vortex mixer
- Gamma counter

5. Specimen Collection and Storage

Sera can be stored up to one week at 2 – 8 °C or at -20 °C for longer periods, preferably in aliquots. 20 µl is sufficient for one assay (duplicate 10 µl determinations). Repeated freezing and thawing or increase in storage temperature must be avoided. Do not use lipaemic or haemolized serum samples.

6. Preparation of Samples and Reagents

6.1 Samples

One the day of the assay, thaw the sera at room temperature and mix gently to ensure homogeneity. Centrifuge serum prior to the assay (preferably for 5 min at 10.000 x g) in a microfuge to remove any particulate material. Please do not omit this centrifugation step if sera are cloudy or contain particulates.

6.2 Reconstitution of the Tracer

Approximately 10 min before use, reconstitute the lyophilized Tracers ^{125}I labelled gAChR each with 0.75 ml Reconstitution Buffer. Dissolve by vortexing briefly (about 5 sec) on a vortex mixer and then keep the vial upright.

The reconstituted Tracers are stable for only a few hours and should be used at once.

7. Test Procedure

Allow all reagents, except **Wash Solution**, to stand at room temperature (20 – 25 °C) for at least 30 minutes before use.

- 7.1. Pipette 10 µl (in duplicate) of **Control -**, **Control + I** & **Control + II** and the sera, into labelled assay tubes (conical tubes recommended).
- 7.2. Add 50 µl of freshly reconstituted **¹²⁵I labelled gAChR** into each tube.
- 7.3. Mix each tube gently on a vortex mixer; cover the tubes with a suitable cover and incubate at room temperature (20 – 25 °C) for 2 hours.

At the beginning of the incubation, determine the total radioactivity for 2 minutes in at least 2 tubes in a gamma counter.

- 7.4. Add 50 µl **Anti Human IgG** to each tube.
- 7.5. Mix each tube gently on a vortex mixer; cover the tubes with a suitable cover and incubate at room temperature (20 – 25 °C) for 2 hours.
- 7.6. Add 1 ml of cold (2 – 8 °C) **Wash Solution** to each tube and mix gently on a vortex mixer.
- 7.7. Centrifuge tubes at 1.500 x g for 20 minutes at 2-8°C.
- 7.8. Decant or aspirate the supernatant, taking care not to disturb the pellet.
- 7.9. Add 1 ml of cold (2 – 8 °C) **Wash Solution** to each tube and carefully resuspend the pellet using a vortex mixer.
- 7.10. Centrifuge tubes at 1.500 x g for 20 minutes at 2 – 8 °C.
- 7.11. Decant or aspirate the supernatant, taking care not to disturb the pellet.
- 7.12. Determine the counts (cpm) in each tube for 2 minutes in a gamma counter.

8. Calculation of Results

The radioactivity in the pellet represents the amount of ^{125}I -labelled gAChR bound by the gAChR Abs. This is often expressed as picomoles of labelled toxin bound per litre of test serum and the relationship between this parameter and pellet radioactivity can be calculated from the knowledge of:

- The counts per minute cpm determined with the gamma counter
- The specific activity A [Ci/mmol] of the ^{125}I -labelled toxin at the time it was used to label gAChRs.
- Decay factor D for the decay of ^{125}I between the tracer manufacture date and the day of the assay.
- The volume of serum used in the assay C (i.e. 10 μl).
- Counter efficiency B of the gamma counter used (e.g. 70 %, then B = 0.7)
- The conversion factor of Curie in decays per minute (2.22×10^{12} dpm/Ci or cpm/Ci)

Values for A and D are on the QC-Certificate included in each kit.

The simplified formula (1) to be used, is as follows:

$$\text{pmol/l} = \frac{(\text{cpm}_{\text{Pos. Control OR Sample}} - \text{cpm}_{\text{Neg. Control}}) \times 1000 \times D}{C \times A \times B \times 2.22 \text{ dpm/Ci}}$$

Example:

$$\frac{(5750 \text{ cpm} - 809 \text{ cpm}) \times 1000 \times 1.32}{10 \mu\text{l} \times 1420 \text{ Ci/mmol} \times 0.7 \times 2.22 \text{ dpm/Ci}} = 295.56 \text{ pmol/l}$$

Typical Results (example only, not for use in calculation of actual results):

	cpm	pmol/l
Negative Control	608	0.0
Positive Control 1	4844	134.2
Positive Control 2	1505	28.4

With the following formula (2) a factor F can be calculated, which is lot specific and indicated on the QC-Certificate.

$$F = \frac{1000}{C \times A \times B \times 2.22 \text{ dpm/Ci}}$$

Should the counter efficiency B of your gamma counter differ from the one stated on the QC-Certificate, then F has to be recalculated accordingly.

Therefore the above formula (1) becomes simplified to the following formula (3):

$$\text{pmol/l} = (\text{cpm}_{\text{Pos. Control OR Sample}} - \text{cpm}_{\text{Neg. Control}}) \times D \times F$$

For assay to be valid, values achieved for both positive controls must be in target range indicated on QC-Certificate included in each kit.

9. Assay Characteristics

This kit is for research use only, the values below are not for use in diagnostic procedures.

The following assay cut off was determined:

Negative	< 10 pmol/l
Indeterminate	between 10 and 15 pmol/l
Positive	≥ 15 pmol/l

However each laboratory should establish its own normal and pathological reference ranges for gAChR Ab levels. Also it is recommended that each laboratory includes its own panel of control samples in the assay.

Sera from 50 individual healthy blood donors were assayed in the ACHRAB Ganglionic Assay RIA. 50 (100%) were identified as being negative for gAChR Ab.

Sera from 30 patients with autoimmune diseases other than those with suspected AAG and related neurological disorders were assayed in the ACHRAB Ganglionic Assay RIA. 29 (96.7%) of GAD or TSH Receptor autoantibody-positive samples were tested negative for gAChR Ab in this study, with 1 further sample (3.3%) providing indeterminate.

10. Modifications of Instructions for Use

Version_4: The ® symbol has been removed from the assay name.

Version_3: Assay is provided in the original kit carton. Correspondingly, the instructions for use were updated with the original manufacturer and the component names as indicated on the labels.

Version_2: Section 5 refined to “Sera can be stored up to one week at 2 – 8 °C or at -20 °C for longer periods, preferably in aliquots.” Section 8 complemented with sample calculation and factor F.

Version_1: Creation of instructions for use. No changes to declare.

11. Literature

- Vernino et al.
Autoantibodies in ganglionic acetylcholine receptors in autoimmune autonomic neuropathies.
N. Engl. J. Med. 2003; **343**: 847-855
- McKeon et al.
The ganglionic acetylcholine receptor autoantibody: oncological, neurological and serological accompaniments
Arch. Neurol. 2009 **66**: 735-741

Pipetting Scheme

Allow all reagents, except Wash Solution to stand at room temperature (20 – 25 °C) for at least 30 minutes before use

		Negative Control	Positive Controls	Samples
Control -	μl	10		
Control + I & + II	μl		10	
Samples	μl			10

¹²⁵ I labelled gAChR	μl	50	50	50
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Vortex gently, in 2 tubes determine total counts for 2 minutes
Cover and incubate for 2 hours at room temperature (20 - 25 °C)

Anti Human IgG	μl	50	50	50
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Vortex gently, cover and incubate for 2 hours
at room temperature (20 - 25 °C)

Wash Solution (cold)	ml	1	1	1
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Centrifuge for 20 minutes at 1500 x g at 2 - 8 °C
Aspirate or decant supernatant carefully

Wash Solution (cold)	ml	1	1	1
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Vortex gently to resuspend pellet
Centrifuge for 20 minutes at 1500 x g at 2 - 8 °C
Aspirate or decant supernatant carefully
Determine counts in tubes for 2 minutes in a gamma counter