Angiotensin II RIA

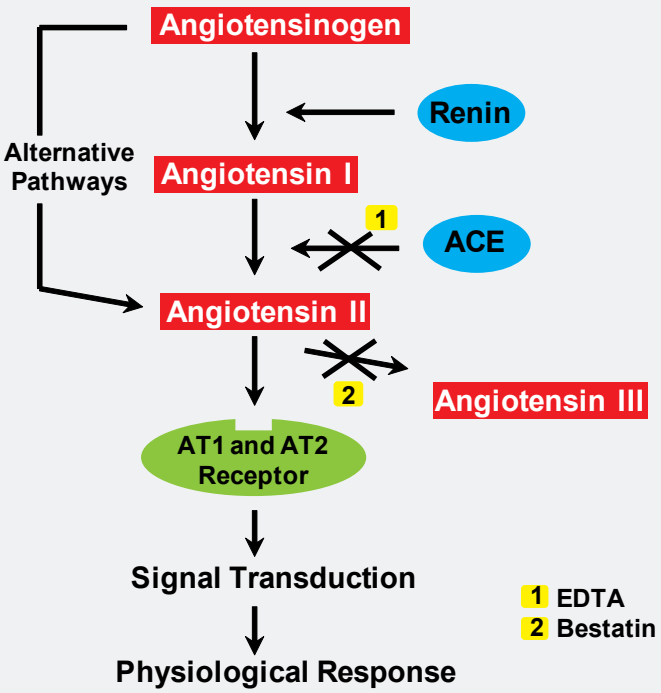
Quantitative Monitoring of Angiotensin II

Quantitative Monitoring of Angiotensin II e.g. in Hypertension

Monitoring of pharmacological effect and efficiency of:

ACE inhibitors

Receptor antagonists



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Quantitative Monitoring of Angiotensin II

Introduction

The renin-angiotensin system (RAS) mainly regulates blood pressure and the preservation of salt and water balance. The major part of Angiotensin II (Ang II), an octapeptide (MW 1045), is being generated from its inactive precursor Ang I by the activity of angiotensin-converting enzyme (ACE). It has been proven a considerable part is being proced via alternative pathways, especially by chimase. The major effects of Ang II are(1):

- Stimulation of aldosterone in the adrenal cortex resulting in salt and water retention
- Aldosterone independent salt and water retention by a proximal tubullus.
- Vasoconstriction and ultimate promotion of a hypertrophic response within the myocardium and vascular smooth muscle cells
- Promotion of cell growth and differentiation within smooth muscle and cardiac cells

Why measure Angiotensin II

Ang II is the hemodynamic effector in the blood pressure regulatory loop controlled by the renin-angiotensin system(2). Further, Ang II is also a growth factor for vascular endothelial cells. It has been suggetsted that elevated plasma Ang II be directly involved in vascular hypertrophy and/or the remodeling of resistance arteries. Ang II is measured either in hypertension research or during therapy follow-up.

Treatment with angiotensin-converting enzyme inhibitors (ACEI): Both, active renin and Ang I immediately increase after ingestion of ACEI, in parallel plasma Ang II decreases. Thus, plasma Ang II reflects a resetting of the RAS at any particular level of a converting enzyme inhibition. Long-term therapy with ACEI often goes along with an escape phenomenon and a return to pre-therapy levels. It is probably caused by alternative pathways of Ang II activation e.g. by Chimase. Thus, a careful monitoring of Ang II during long-term therapy may be advisable.

Treatment with angiotensin-receptor antagonists: These antihypertensives specifically block the actions of Ang II at the AT1-receptor. Unlike ACEI, they are accompanied by an immediate increase in Ang II. Although the implications of this increase in Ang II are unclear, unabated Ang II stimulation of the AT"-receptor may prove significant and a reason to monitor ACEI (3).

The determination of Ang II is helpful in monitoring the pharmacological effect and efficiency of a wide variety of angiotensin converting enzyme inhibitors or Angiotensin II receptor antagonists and for monitoring the efficiency of therapeutic approaches in treating congestive heart failure.

Assay Performance Data

Intra-assay precision (CV) **8.3%**
4 plasma samples; range: 5.8-242 pg/ml; 20 duplicates

Inter-assay precision (CV) **11.5%**
3 plasma samples; range: 4.1-152.9; 20 runs

Dilution linearity **93.5%**
2 samples diluted with Ang II free plasma; 1:2 – 1:64

Spiking recovery **99.2%**
8 samples spiked with Ang II (2.5 – 250 pg/ml)

Analytical sensitivity 1.0 pg/ml
20 Zero Calibrator (Tris buffer) duplicates

Specificity (% crossreactivity)

[Val5] Angiotensin II	44.0
[Sar1-Ile8] Angiotensin II	3.2
Angiotensin I	0.14
Angiotensin (2-8) = Ang III	108.0
Angiotensin (3-8) Hexapeptide	96.0
Angiotensin (4-8) Pentapeptide	39.0
Angiotensin (5-8) Tetrapeptide	0.03
Angiotensin (1-7) Heptapeptide	0.01
[Arg8] Vasopressin	0.01

Tracer shelf life
7 weeks after labeling

Sample type
1.2 ml EDTA Plasma
To be extracted with a reversed-phase cartridge

Standard Range
2-500 pg/ml

Reference ranges (normal blood donors) **median 5.9 pg/ml;** (n=81 samples, range: 0.8 - 16 pg/ml)

Calibration against the WHO Standard (MRC 70/302)

A sample stabilizer, Bestatin, can be ordered separately.

Assay Procedure

Pipet 500 µl Standards, Controls or extracted plasma samples into polystyrene tubes

add 100 µl of antiserum

↓ incubate 16 hours at 2-8°C

add 100 µl of Tracer

↓ incubate 6 hours at 2-8°C

add 100 µl of 2nd antibody

↓ incubate 30 min at 2-8°C

add 1.0 ml of water

↓ centrifuge 15 min at 2-8°C 1000 x g

aspirate and count for 1 minute

Time to Result: 1 Day

Literature

(1) Katz AM: J Mol Cell Cardiol 22 739-47 (1990)
(2) Juillerat L, Nussberger J et al.: Hypertension 16, 564-72 (1990)
(3) Johnston CI; Lancet 346 1403-7 (1995)

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Ordering Codes:

Angiotensin II RIA Kit (100 tests):	RK-A22
Extraction columns	B-AEC
Bestatin ready-to-use	B-BST

Related Products:

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