



## Anti-Angiotensin II type 1-receptor autoantibodies

|                     |  |
|---------------------|--|
| <b>Acronyms</b>     | AT1R, AT1-AA   |
| <b>Indications</b>  | <ul style="list-style-type: none"><li>▶ Primary aldosteronism (adenoma or hyperplasia of adrenal gland)</li><li>▶ Preeclampsia</li></ul>   |
| <b>see also</b>     | <ul style="list-style-type: none"><li>▶ <a href="#">Autoantibodies in diseases of the adrenal gland</a></li><li>▶ <a href="#">Autoantibodies in cardiovascular diseases</a></li></ul>  |
| <b>Prevalence</b>   | <p>Stimulating autoantibodies reacting against the angiotensin II type 1 receptor (AT1R) have been described for the first time in patients suffering from preeclampsia (Wallukat et al. 1999), later on in patients with steroid resistant renal transplant rejection (Dragun et al. 2005) and more recently in 32 % (ELISA) respectively in 60 % (bioassay) of patients with primary aldosteronism (Rossitto et al. 2013; Kem et al. 2014; Li et al. 2014).</p> <p>The human autoantibodies caused proteinuria, glomerular endotheliosis and placental lesions in pregnant mice (Zhou et al. 2008). Chronic administration of AT1-AA also induced blood pressure elevations in pregnant rats (LaMarca et al. 2009).</p>  |
| <b>Test methods</b> | ELISA with a synthetic peptide covering part of the second extracellular loop (amino acids 181 - 187) of the human AT1 receptor (Li et al. 2014). Bioassays with AT1R transfected CHO cells (Li et al. 2014) or with cardiomyocytes isolated from neonatal rats (Wallukat et al. 1999). Indirect immunofluorescence and Western blot using histological preparations or cell extracts of vascular smooth muscle cells (Wallukat et al. 1999).  |
| <b>Literature</b>   | <p>Dragun D, Müller DN, Bräsen JH, et al.: Angiotensin II type 1-receptor activating antibodies in renal-allograft rejection. <i>N Engl J Med</i> (2005); 352: 558 - 569 (PMID: <a href="#">15703421</a>).</p> <p>Kem DC, Li H, Velarde-Miranda C, Liles C, Vanderlinde-Wood M, Galloway A, Khan M, Zillner C, Benbrook A, Rao V, Gomez-Sanchez CE, Cunningham MW, Yu X: Autoimmune mechanisms activating the angiotensin AT1 receptor in 'primary' aldosteronism. <i>J Clin Endocrinol Metab</i> (2014); 99(5): 1.790 - 1.797 (PMID: <a href="#">24552217</a>).</p> <p>LaMarca B, Parrish MR, Ray LF, et al.: Hypertension in Response to Autoantibodies to the Angiotensin II Type I Receptor (AT1-AA) in Pregnant Rats: Role of Endothelin-1. <i>Hypertension</i> (2009); 54: 905 - 909 (PMID: <a href="#">19704104</a>).</p> <p>Li H, Yu X, Cicala MV, Mantero F, Benbrook A, Veitla V, Cunningham MW, Kem DC: Prevalence of angiotensin II type 1 receptor (AT1R)-activating autoantibodies in primary aldosteronism. <i>J Am Soc Hypertens</i> (2014); [Epub ahead of print] (PMID: <a href="#">25537460</a>).</p> <p>Rossitto G, Regolisti G, Rossi E, Negro A, Nicoli D, Casali B, Toniato A, Caroccia B, Seccia TM, Walther T, Rossi GP: Elevation of angiotensin-II type-1-receptor autoantibodies titer in primary aldosteronism as a result of aldosterone-producing adenoma. <i>Hypertension</i> (2013); 61(2): 526 - 533 (PMID: <a href="#">23248149</a>).</p> <p>Wallukat G, Homuth V, Fischer T, Lindschau C, Horstkamp B, Jüpner A, Baur E, Nissen E, Vetter K, Neichel D, Dudenhausen JW, Haller H, Luft FC: Patients with preeclampsia develop agonistic autoantibodies against the angiotensin AT1 receptor. <i>J Clin Invest</i> (1999); 103: 945 - 952 (PMID: <a href="#">10194466</a>).</p> <p>Yang J, Li L, Shang JY, Cai L, Song L, Zhang SL, Li H, Li X, Lau WB, Ma XL, Liu HR: Angiotensin II type 1 receptor autoantibody as a novel regulator of aldosterone independent of preeclampsia. <i>J Hypertens</i> (2015); 33(5): 1046 - 1056 (PMID: <a href="#">25693057</a>).</p> |



## Anti-Angiotensin II type 1-receptor autoantibodies

Zhou CC, Zhang Y, Irani RA, et al.: Angiotensin receptor agonistic autoantibodies induce preeclampsia in pregnant mice. *Nat Med* (2008); 14: 855 - 862 (PMID: [18660815](#)).

### supplementary literature

Dechend R, Homuth V, Wallukat G, et al.: AT(1) receptor agonistic antibodies from preeclamptic patients cause vascular cells to express tissue factor. *Circulation* (2000); 101: 2.382 - 2.387 (PMID: [10821814](#)).

Dechend R, Viedt C, Müller DN, et al.: AT1 receptor agonistic antibodies from preeclamptic patients stimulate NADPH oxidase. *Circulation* (2003); 107: 1.632 - 1.639 (PMID: [12668498](#)).

Dechend R, Müller DN, Wallukat G, et al.: Activating auto-antibodies against the AT1 receptor in preeclampsia. *Autoimmun Rev* (2005); 4: 61 - 65 (PMID: [15652781](#)).

Dechend R, Homuth V, Wallukat G, et al.: Agonistic antibodies directed at the angiotensin II, AT1 receptor in preeclampsia. *J Soc Gynecol Investig* (2006); 13: 79 - 86 (PMID: [16443499](#)).

Xia Y, Ramin SM, Kellems RE: Potential roles of angiotensin receptor-activating autoantibody in the pathophysiology of preeclampsia. *Hypertension* (2007); 50: 269 - 275 (PMID: [17576854](#)).

Parrish MR, Ryan MJ, Glover P, Brewer J, Ray L, Dechend R, Martin JN, LaMarca: Angiotensin II Type 1 Autoantibody Induced Hypertension during Pregnancy is associated with Renal Endothelial Dysfunction. *Gend Med* (2011); 8: 184 - 188 (PMID: [21600854](#)).

LaMarca B, Wallace K, Granger J: Role of angiotensin II type I receptor agonistic autoantibodies (AT1-AA) in preeclampsia. *Curr Opin Pharmacol* (2011); 11: 175 - 179 (PMID: [21317038](#)).