



Metro Center for High Technology Bldg. 2727 Second Ave. Suite 4113 Detroit, MI 48201 Phone: (313) 961-1606; Fax: (313)963-7130 Email: <u>info@DetroitRandD.com</u> Web: www.DetroitRandD.com

Hypertension/Stroke ELISA (20-HETE) kit

Cat # 20H 1: ELISA kit for measuring 20-HETE in biological samples

This competitive ELISA kit is for determination of 20-HETE (also known as 20-OH-AA) levels in biological samples. The specificity of the 20-HETE ELISA was investigated using authentic 20-HETE and a panel of fatty acids which, based on their structure, might be anticipated to compete with 20-HETE for binding to antibodies for 20-HETE. Anti-20-HETE did not cross-react with 14,15- and 11,12-DHETs or PGE₂ and showed almost no cross-reactivity even with structurally extremely similar arachidonic acid (AA), linoleic acid and linolenic acid (see plot below).

20-HETE is a potent vasoconstrictor ,especially in the microvasculature, that induces vascular smooth muscle cell depolarization. Increased 20-HETE is linked to development of cardiovascular diseases, including stroke, CHD, atherosclerosis and hypertension.

Each kit is suitable for triplicate analyses of up to 24 samples and contains a 96-well plate, 20-HETE standard, 20-HETEconjugated horseradish peroxidase (HRP), and buffers for sample and HRP dilutions, and plate washing.



References

- 1. Imaizumi et al. L-4F differentially alters plasma levels of oxidized fatty acids resulting in more anti-inflammatory HDL in mice. Drug Metab. Letters, 4, 139-148, 2010.
- Cervenka, Kramer, Falck, Imig, Hammock et al. Combined inhibition of 20-HETE formation and of EET degradation attenuates hypertension and hypertension-induced end-organ damage in Ren-2 transgenic rats. Clinical Science 118, 617-632. 2010.
- 3. Cervenka, Kramer, Falck, Imig et al. Intrarenal CYP-450 metabolites of arachidonic acid in the regulation of the nonclipped kidney function in two-kidney, one-clip Goldblatt hypertensive rats. J Hypertens 28, 582-593, 2010.
- 4. Hu, Wang et al. Peripheral and central augmentation indexes in relation to the CYP4F2 polymorphisms in Chinese. J Hypertens 29, 501-508, 2011.
- 5. Buharalioglu et al. Piroxicam reverses endotoxin-induced hypotension in rats: contribution of vasoactive eicosanoids and nitric oxide. Basic Clin Pharmacol Toxicol 186–194, 2011.

- Na-Bangchang et al. Study on the association between environmental cadmium exposure, cytochrome P450-mediated 20-HETE, hemeoxygenase-1 polymorphism and hypertension in Thai population residing in a malaria endemic areas with cadmium pollution. Environ Toxicol Pharmacol 31, 416-426, 2011.
- 7. Grande et al. Increased oxidative stress, the renin-angiotensin system, and sympathetic overactivation induce hypertension in kidney androgenregulated protein transgenic mice. Free Radical Biology & Medicine, 51: 1831-1841. 2011.
- 8. Nikolaeva et al. The circadian clock modulates renal sodium handling. J. Am. Soc. Nephrol. 23: 1019-1026, 2012.
- Onoe et al. Increase of 20-HETE synthase after brain ischemia in rats revealed by PET study with (11)C-labeled 20-HETE synthase-specific inhibitor. J Cereb Blood Flow Metab 32, 1737-1746, 2012.
- 10. Dong H. Metabolomic profiling of lipids for biomarker discovery. Biochem Anal Biochem 1, 5, 2012.
- Fordsmann JC, Ko RW, Choi HB, Thomsen K, Witgen BM, Mathiesen C, Lønstrup M, Piilgaard H, MacVicar BA, Lauritzen M. Increased 20-HETE synthesis explains reduced cerebral blood flow but not impaired neurovascular coupling after cortical spreading depression in rat cerebral cortex. J Neurosci 33, 2562-2570, 2013.
- Stobart JL, Lu L, Anderson HD, Mori H, Anderson CM. Astrocyte-induced cortical vasodilation is mediated by D-serine and endothelial nitric oxide synthase. PNAS USA. 110, 3149-3154, 2013.
- 13. Alexanian, A, Sorokin A. Targeting 20-HETE producing enzymes in cancer--rationale, pharmacology and clinical potential. Onco Targets and Therapy 6: 243-255, 2013.
- 14. Raso et al. N-Palmitoylethanolamide protects the kidney from hypertensive injury in spontaneously hypertensive rats via inhibition of oxidative stress. Pharmacological Research 76: 67-76, 2013.
- 15. Eid et al. 20-HETE and EETs in diabetic nephropathy: A novel mechanistic pathway. PLOS One 8: e70029, 2013
- 16. Ross et al. Proinflammatory high-density lipoprotein results from oxidized lipid meditors in the pathogenesis of both idiopathic and associated types of pulmonary arterial hypertension. Pulmonary circulation 5: 640-648, 2015

17. Soleimani et al. (2016) Prostaglandin-E2 mediated increase in calcium and phosphate excretion in a mouse model of distal nephron salt wasting. PLOS One 11(7): e0159804, 2016

18. Kingma, JG et al. Effect of subtotal renal nephrectomy on CYP450-mediated metabolism of arachidonic acid: A potential player in pathogenesis of renocardiac syndrome? Cardiovasc Pharm Open Access doi: 10.4172/2329-6607.1000197, 2016

19. Nowicki, S. et al. Role of 20-hydroxyeicosatetranoic acid (20-HETE) in androgen-mediated cell viability in prostate cancer cells. Hormones and Cancer 8: 243-256, 2017

20 Elmarakby, A. A. et al. Meloxicam fails to augment the reno-protective effects of soluble epoxide hydrolase inhibition in streptozotocininduced diabetic rats via increased 20-HETE levels. Prostaglandins and Other Lipid Mediators 132: 3-11, 2017

. 21. Anderson, C. M. et al. Astrocytes drive cortical vasodilatory signaling by activating endothelial NMDA receptors. JCBFM, DOI: 10.1177/0271678X17734100., 2017.

.22. EI-Mas, M. M. et al. CYP4A/CYP2C modulation of the interaction of calcium channel blockers with cyclosporine on EDHF-mediated renal vasodilations in rats. Toxicology and Applied Pharmacology 334: 110-119, 2017.

23. Costa, T.J. et al. Detrimental effects of testosterone addition to estrogen therapy involve cytochrome P-450-induced 20-HETE synthesis in aorta of ovariectomized spontaneously hypertensive rat (SHR), a model of postmenopausal hypertension. Frontiers in Physiology 9: 490. 2018.

. 24. Boonprasert, K. et al. Is renal tubular cadmium toxicity clinically relevant? Clinical Kidney Journal, 2018, 1-7. 2018.

. 25. Tunaru, S. et al. 20-HETE promotes glucose-stimulated insulin secretion in an autocrine manner through FFAR1. Nature Communications 9: 177. 2018.

26. Rong, R. et al. Angiotensin II upregulates CYP4A isoform expression in the rat kidney through angtiotensin II type 1 receptor. Prostaglandins and Other Lipid Mediators 139: 80-86. 2018.

Specificity of anti-20-HETE ELISA

Eicosanoids	% Binding of control
20-HETE	100.00
Arachidonic Acid	<0.02
Linoleic Acid	<0.02
Linolenic Acid	<0.02
15-HETE	<0.02
14,15-DHET	<0.02
11,12-DHET	<0.02
PGE ₂	<0.02