

Brain receptors targeted to treat inflammatory response and human hypertension

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Credit: Louisiana State University

According to current statistics, hypertension affects more than 33% of

US adults. Despite the availability of several antihypertensive medications, the morbidity and mortality caused by hypertension is on the rise, suggesting the need for investigation of novel signaling pathways involved in its pathogenesis.

"Recent evidence suggests that the [innate immune system](#) plays an important role in several inflammatory processes affecting the cardiovascular system, including [hypertension](#). Toll-like receptors (TLR) are critical components of the innate immune system. Our laboratory tested 13 TLRs and found that TLR4 was up-regulated in hypertensive animal [brain](#), suggesting its critical role in hypertension associated inflammatory process," said Dr Deepmala Agarwal, whose research on TLR4 and its role in hypertension was recently published in a world renowned journal *Cardiovascular Research*, published by the European Society of Cardiology. An exhaustive editorial commentary was written about the work and its significance to the cardiovascular and immunology fields.

Deepmala and her coworkers at Louisiana State University conducted cutting edge research using an animal model of human hypertension. They employed a unique, real-time blood pressure monitoring radio-telemetry system to carry out this research. Using stereotaxic surgical procedures and a novel TLR4 blocker, they blocked TLR4 in the brain. They used state-of-the-art devices and molecular biology techniques to arrive at their results. They found that blocking TLR4 in the brain not only attenuates inflammation but also reduces blood pressure in the animal model of human hypertension.

"Our understanding about the role played by brain and its immune components in hypertension has widened due to this research. Many existing [blood pressure](#) medications are not able to cross blood-brain barrier, and thus, are not fully effective to control hypertension in long run," said Deepmala. Using her research, scientists can now specifically

target the brain centers for treatment of hypertension.

Deepmala's breakthrough research has major significance to the field of cardiology as well as immunology. Her work underlines the key role played by brain TLR4 signaling in the pathogenesis of hypertension. It also suggests that TLR4 could be targeted as a novel therapeutic target for the treatment of human hypertension.

More information: Journal Reference: Central blockade of TLR4 improves cardiac function and attenuates myocardial inflammation in angiotensin II-induced hypertension. *Cardiovascular Research*. 2014 Jul 1;103(1):17-27.

Provided by Louisiana State University

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