

Debating the source of hypertension

Is high blood pressure caused by the kidney or the brain? A recent issue of *Experimental Physiology* hosted a debate on this question between experts from each side of the fence. “This frank exchange of views ... will undoubtedly guide future studies to reveal fundamental new knowledge that will inform the future treatment of high blood pressure” says Chief Editor of the journal, David Paterson.

According to Jean-Pierre Montani from the University of Fribourg, Switzerland, and Bruce Van Vliet, from the Memorial University of Newfoundland, Canada, the kidney-centric circulatory model proposed by Arthur Guyton in 1972 still remains relevant. As Montani and Van Vliet explain, long-term control of blood pressure is so inextricably linked to sodium balance in this model that all other factors are thought to act primarily by modulating this association.

However, John Osborn and colleagues from the Universities of Minnesota and Michigan State challenge the capacity of Guyton’s model to explain all forms of hypertension, arguing that

it overestimates the role of the kidney. They point to evidence that neurogenic hypertension can persist in the face of renal denervation, which indicates that the sympathetic nervous system has the capacity to control arterial pressure independently of the kidney.

Both groups agree that computational modeling holds great promise to delineate the complex interplay of factors that mediates circulatory control. Whether the Guyton model can serve as the basis of future models remains a matter of debate. As Montani and Van Vliet caution, “mathematical models must be well rooted in empirical data to confirm the behavior of the complete model and its components”.

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Original articles Montani, J. P. & Van Vliet, B. N. Understanding the contribution of Guyton’s large circulatory model to long-term control of arterial pressure. *Exp. Physiol.* **94**, 382–388 (2009).
Osborn, J. W., Averina, V. A. & Fink, G. D. Current computational models do not reveal the importance of the nervous system in long-term control of arterial pressure. *Exp. Physiol.* **94**, 389–396 (2009).