

CORRESPONDENCE

Hypercapnic Pulmonary Vasoconstriction contributes to Regional Perfusion Distribution: Relevance to Asthma

Authors: Keith L. Dorrington, Nick P. Talbot, and Peter A. Robbins

Address: Department of Physiology, Anatomy & Genetics

University of Oxford

Sherrington Building, Parks Road, Oxford, OX1 3PT, UK

Corresponding Author:

Professor Peter A Robbins

Department of Physiology, Anatomy & Genetics, University of Oxford

Sherrington Building, Parks Road, Oxford, OX1 3PT, UK

Tel: +44-1865-272490

Fax: +44-1865-282486

Email: peter.robbins@dpag.ox.ac.uk

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To the Editor:

Kelly *et al* report that hypoxic pulmonary vasoconstriction does not explain all regional perfusion redistribution in asthma (1). To explain this phenomenon, the authors suggest a number of hypothetical and unproven mechanisms. However, none of these is necessary. Regional hypoventilation generates regional hypercapnia, and hypercapnia vasoconstricts the human pulmonary circulation just as surely as hypoxia. The vasoconstrictor action of hypercapnia was shown in 1970 in cats and dogs by Barer *et al*, who demonstrated that both hypoxia and hypercapnia contribute to perfusion redistribution during hypoventilation (2). More recently, studies in human volunteers have demonstrated a marked pulmonary vasoconstrictor effect of hypercapnia and vasodilatory effect of hypocapnia (3). These effects have been shown to be additive to those of hypoxia (4). Such is the sensitivity of the pulmonary vasculature to CO₂ that it dominates over O₂ in regional vascular control in about half of the healthy lung at sea level (5). These findings strongly suggest that the main unidentified factor responsible for regional perfusion redistribution in the experiments of Kelly *et al* is the hypercapnia associated with hypoventilation.

References

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