Reply to Hermand, Voituron, Lhuissier, and Richalet

Luc J. Teppema and Remco R. Berendsen
Department of Anesthesiology, Leiden University Medical Centre, Leiden, The Netherlands

TO THE EDITOR: We thank Hermand et al. (2) for their reply to our letter. We have several comments to their recently published data on the effect of AZ on breathing to which they refer. First, to assess CO2 sensitivity they applied Read rebreathing and reported an AZ-induced metabolic acidosis, a fall in PaCO2, and an increase in chemosensitivity. The latter, however, is an artefact, because due to the increased ratio of the amplitude (A) of the initial CO2 step and the subsequent rate of rise (R) of the PaCO2, metabolic acidosis causes an increase in the rebreathing slope by itself. This (widely ignored) feature of the Read rebreathing technique thus originates from a different experimental paradigm (1). A metabolic acidosis of the type caused by AZ results in a parallel shift of the linear steady state CO2 response curve (3). Consequently, also consistent with the inability of AZ to cross the blood-brain barrier, there is no reason to claim an increase in central CO2 sensitivity. Second, even with a limited rise in controller gain combined with a decrease in PaCO2, the loop gain of the respiratory system (LG) can be reduced considerably explaining the stabilizing effect of AZ. The LG is a better predictor of stability than the controller gain (CO2 sensitivity) alone (4).

DISCLOSURES
No conflicts of interest, financial or otherwise, are declared by the author(s).

AUTHOR CONTRIBUTIONS
L.J.T. drafted manuscript; L.J.T. edited and revised manuscript; L.J.T. and R.R.B. approved final version of manuscript.

REFERENCES

Address for reprint requests and other correspondence: L. Teppema, Dept Anesthesiology, Leiden Univ. Medical Centre, Leiden, The Netherlands (e-mail: l.j.s.m.teppema@lumc.nl).