topulmonary syndrome, pulmonary edema), shunt is readily detected with MIGET (1, 7). Also, since precapillary gas exchange has been shown for oxygen in normal lungs (2), their explanation is unlikely, as it should similarly overcome “shunting” for \( \text{O}_2 \) if such occurred in the arteriovenous pathways found by our colleagues.

Finally, they suggest that using 100% oxygen for measuring shunt is invalid, implying that \( \text{O}_2 \) constricts some of the pulmonary circulation (5). However what they demonstrate is the disappearance of microbubbles, not of shunt. There are several explanations for this that do not involve rewriting the textbooks on the effects of oxygen on the pulmonary circulation, including how changing gas partial pressures affect microbubble size (10).

REFERENCES

4. Hsia CC, Johnson RI Jr, McDonough P, Dane DM, Hurst MD, Fehmel JL, Wagner HE, Wagner PD. Residence at 3,800-m altitude for 5 mo in growing dogs enhances lung diffusing capacity for oxygen that closes inducible intrapulmonary shunt pathways (6), which could also be limited (if occurring at all) in a 25–50 \( \mu \text{m} \) vessel with a wall thickness estimated to be \( \sim 2 \) to 4 \( \mu \text{m} \) (7).

Why MIGET is unable to detect these shunts is a mystery. A possible explanation is non-capillary inert gas exchange(5). More perplexing, however, is why MIGET has not identified intracardiac right-to-left shunting through a patent foramen ovale (PFO) considering a prevalence of \( \sim 25\% \) (3). MIGET would not be able to distinguish between intracardiac and intrapulmonary shunting; however, it seems with all the subjects studied a few PFOs would have surfaced, as they have in our studies (1, 6, 10). Recently we showed that hyperoxia closes inducible intrapulmonary shunt pathways (6), which would explain why the 100% \( \text{O}_2 \) test also failed to identify these shunts.

Dr. Seuss said, “Sometimes the questions are complicated and the answers are simple.” The evidence of exercise-induced intrapulmonary shunt in simple: saline contrast bubbles and microspheres traverse the pulmonary circulation during exercise, but not at rest. Regardless of their size, like Horton’s Whos, the shunts are real, and likely important.

REFERENCES