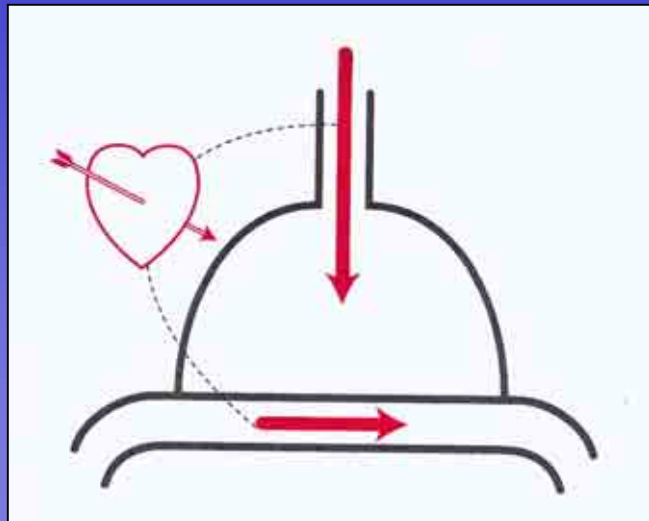
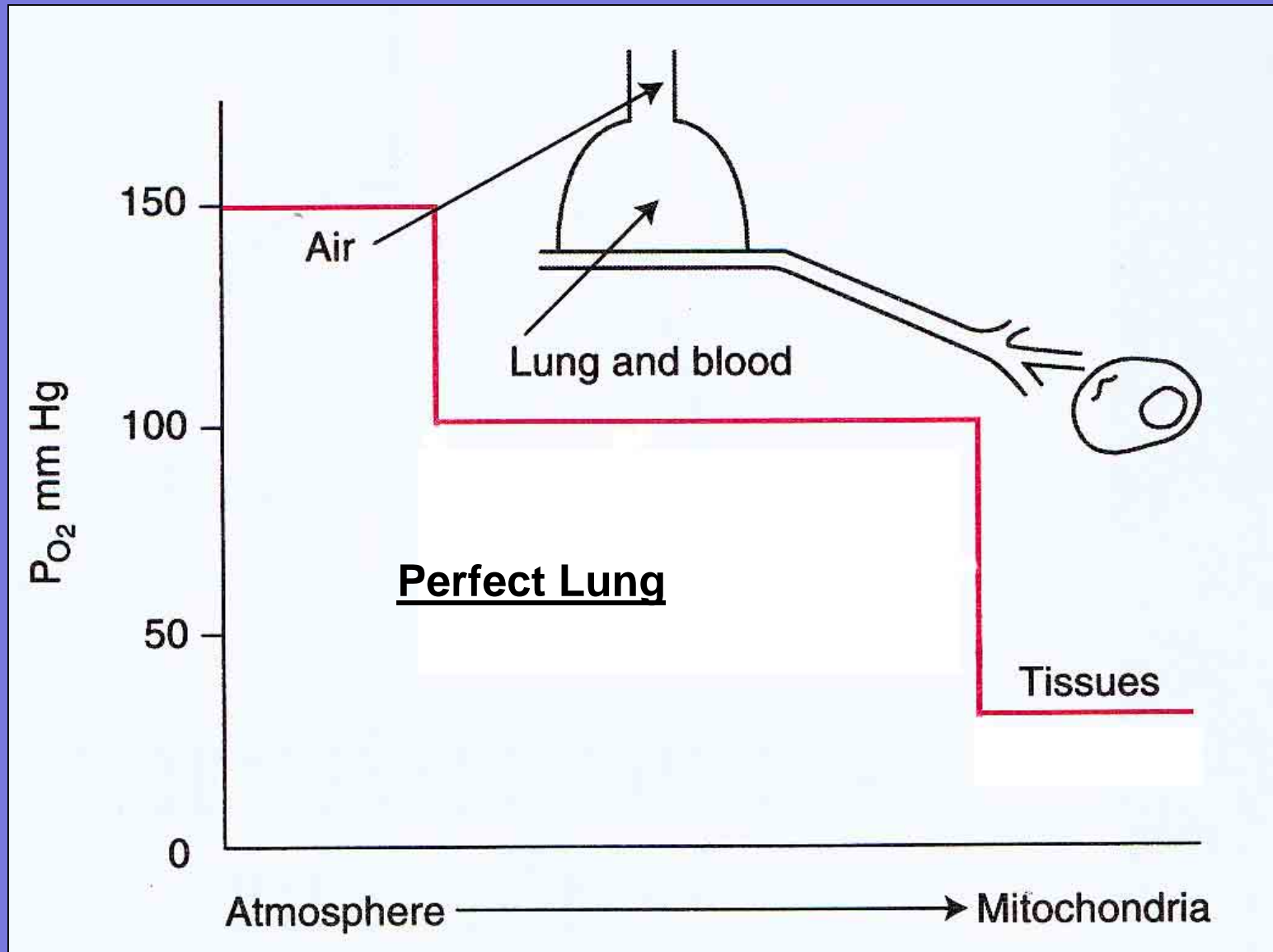
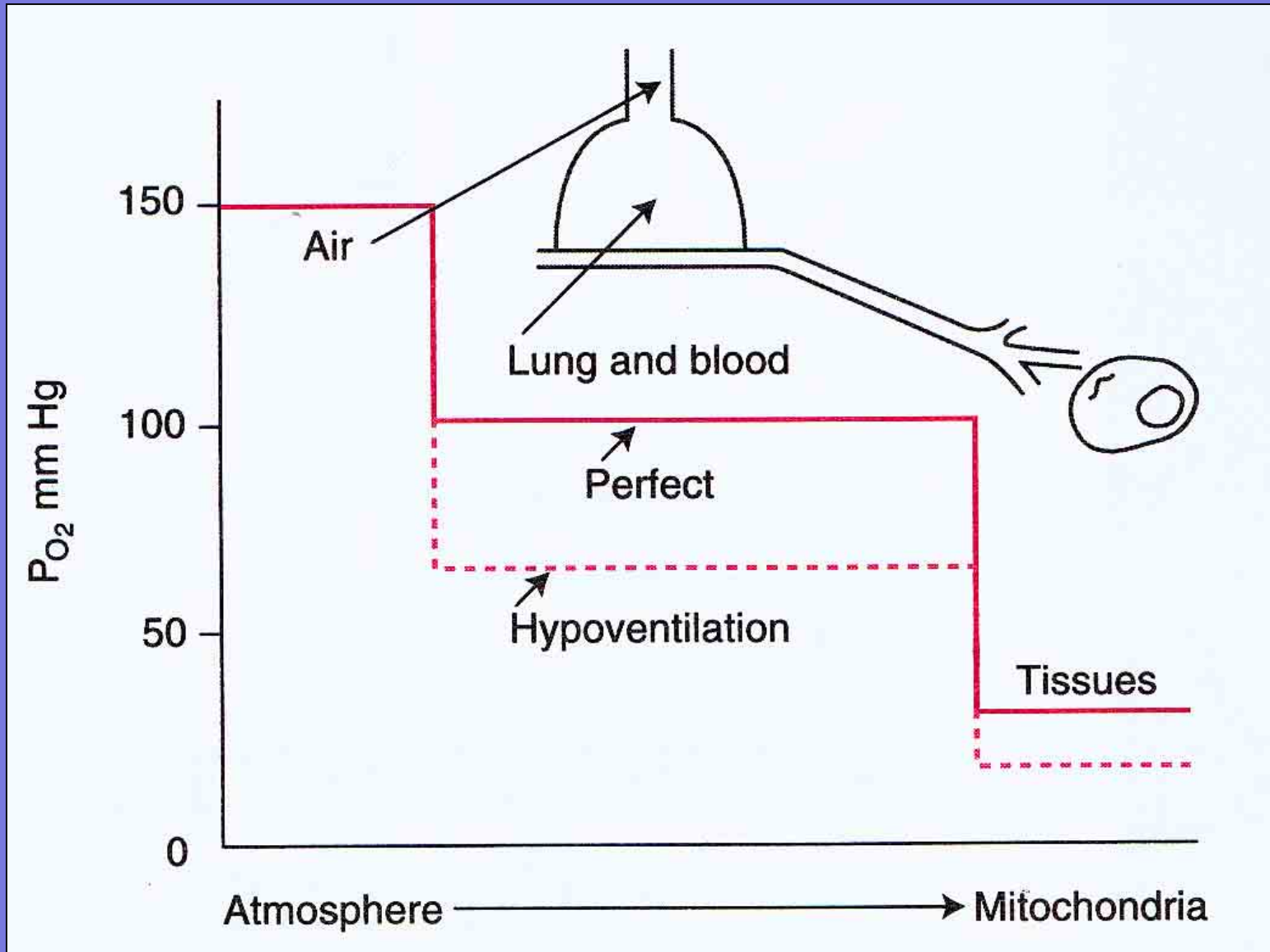


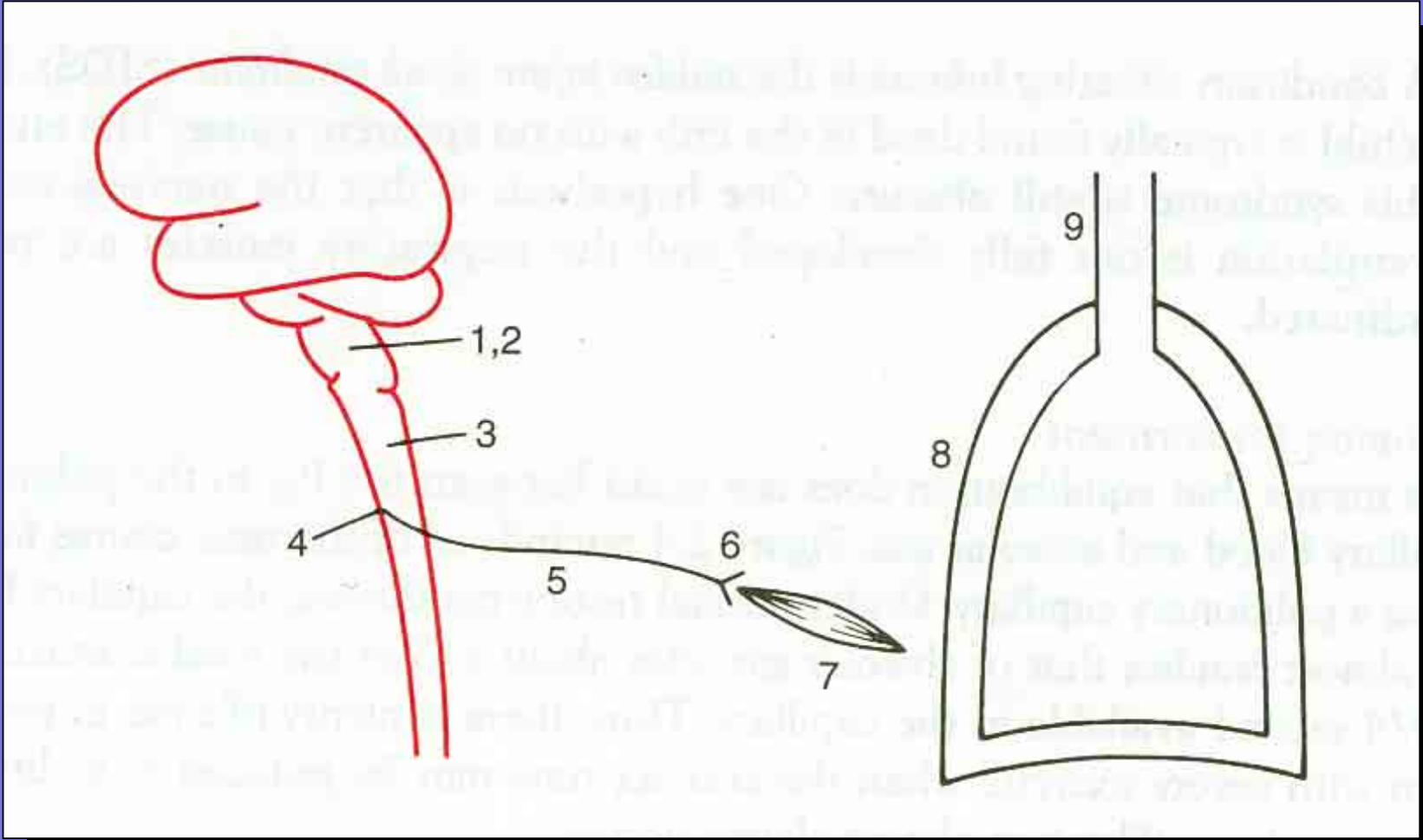
Ventilation-Perfusion Relationships and Gas Exchange

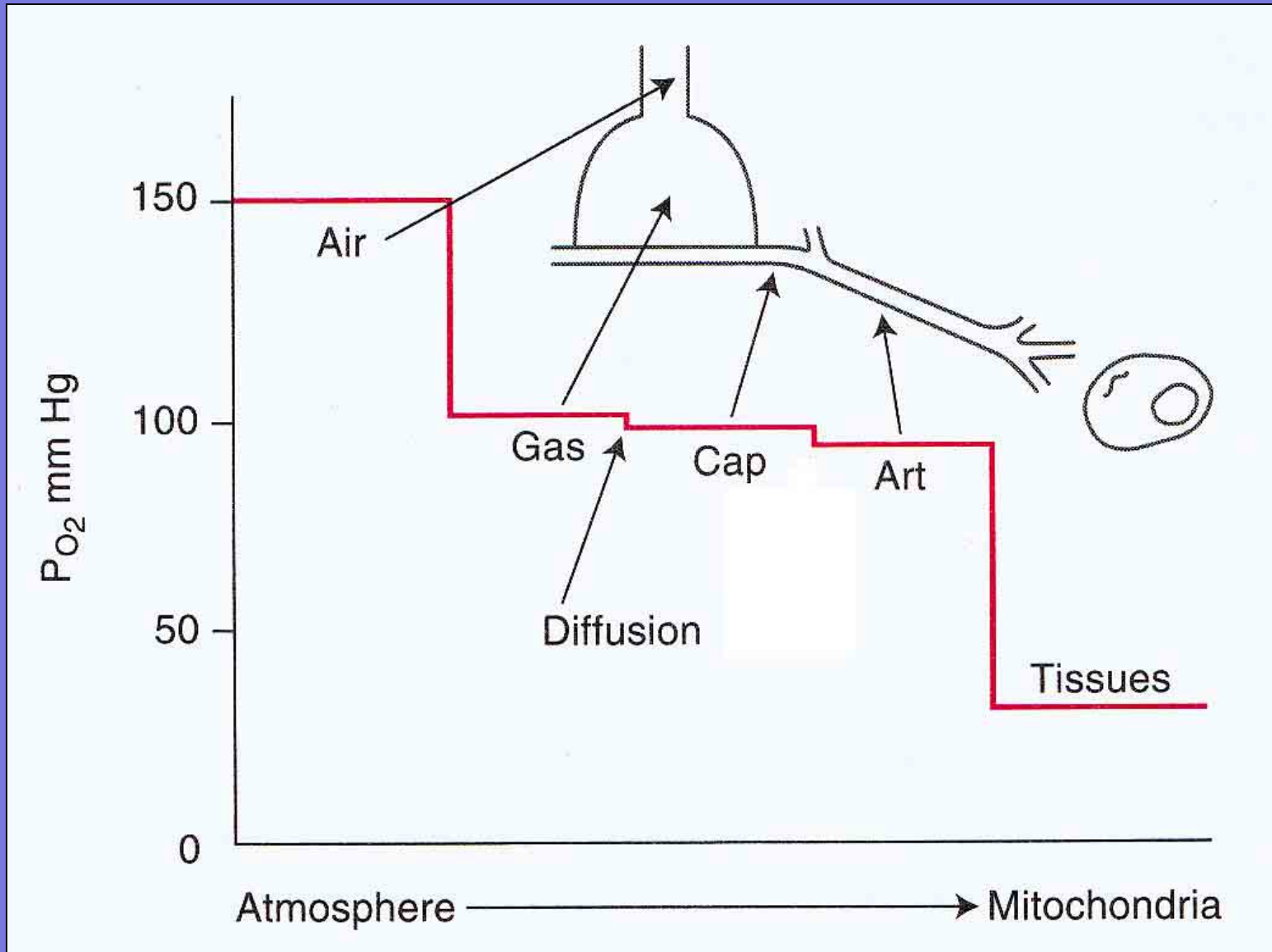


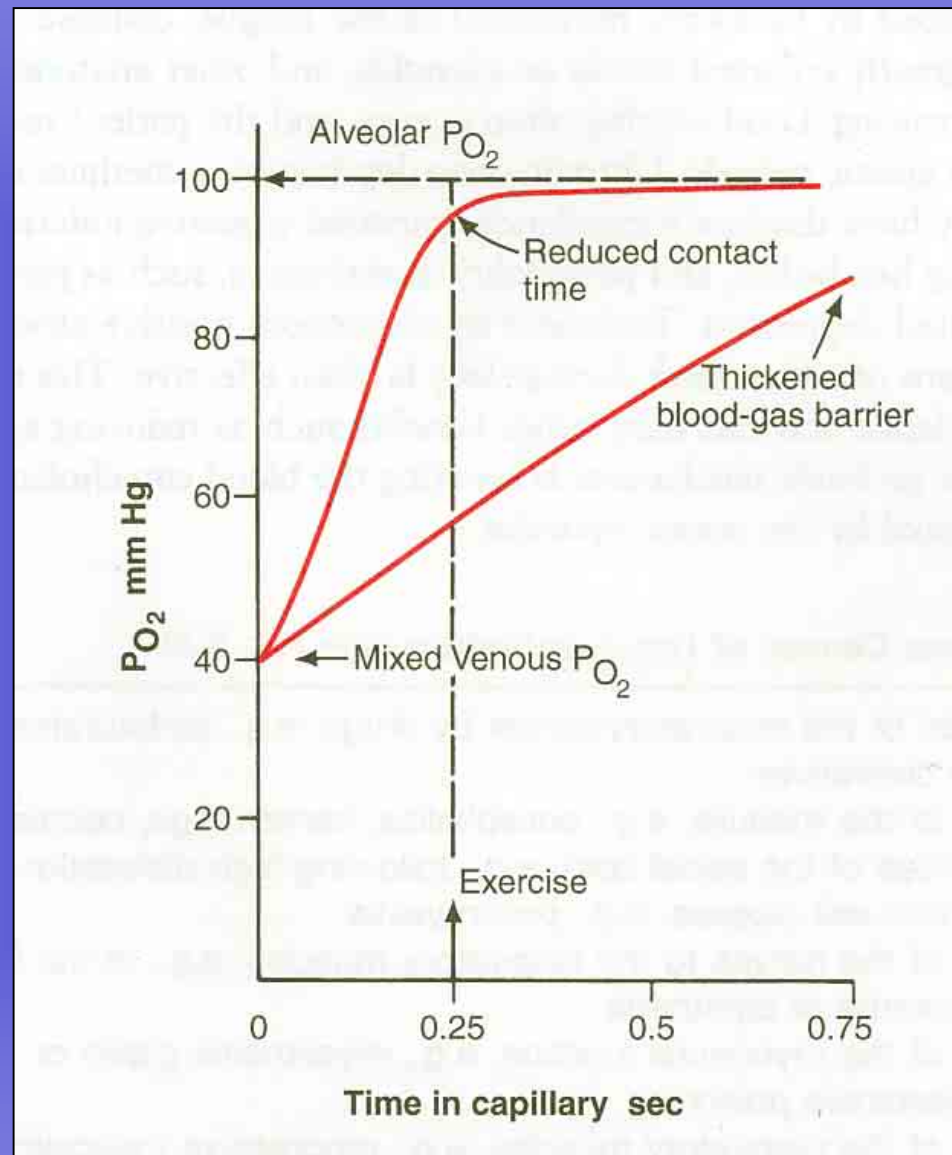
John B. West

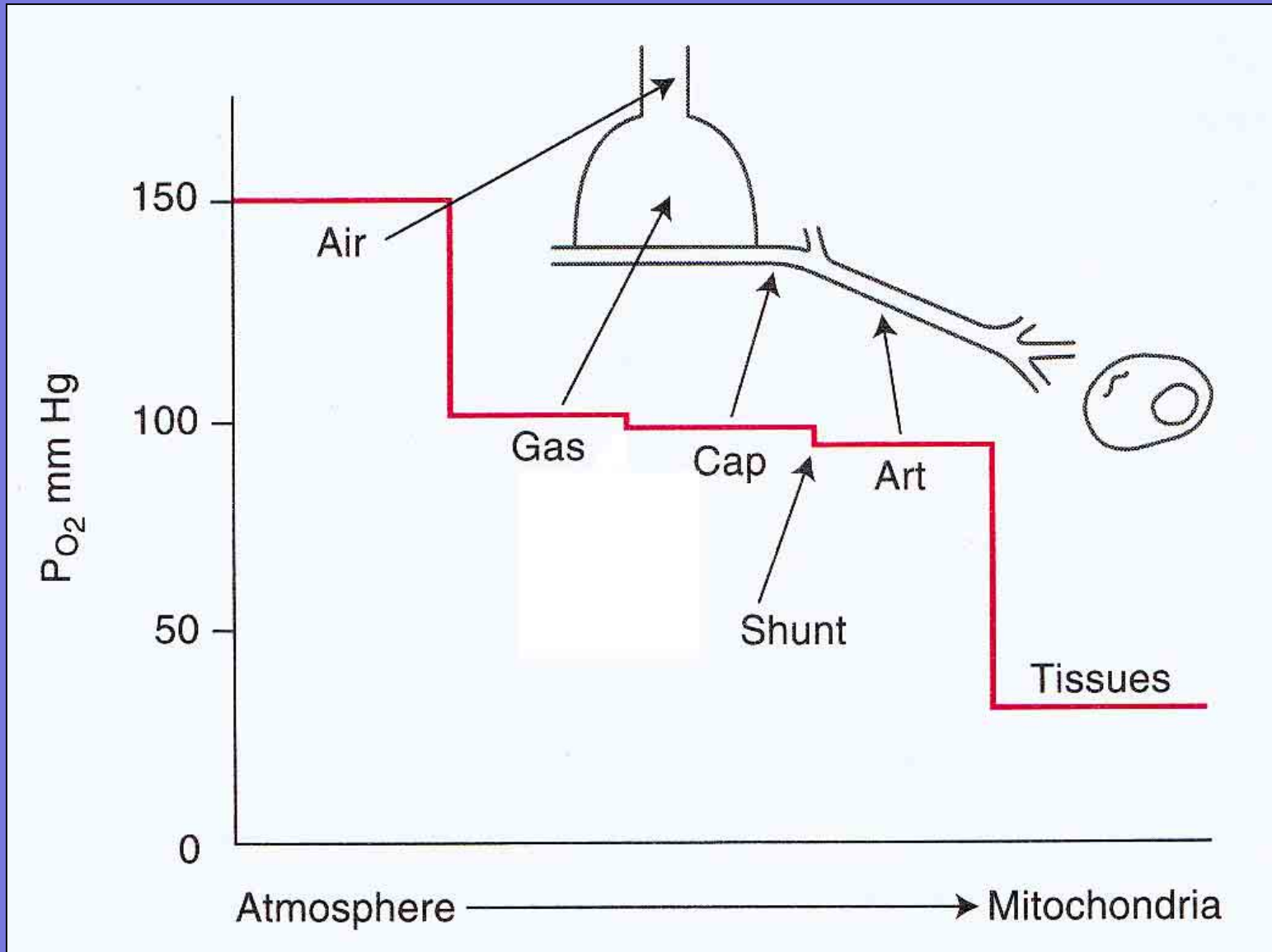


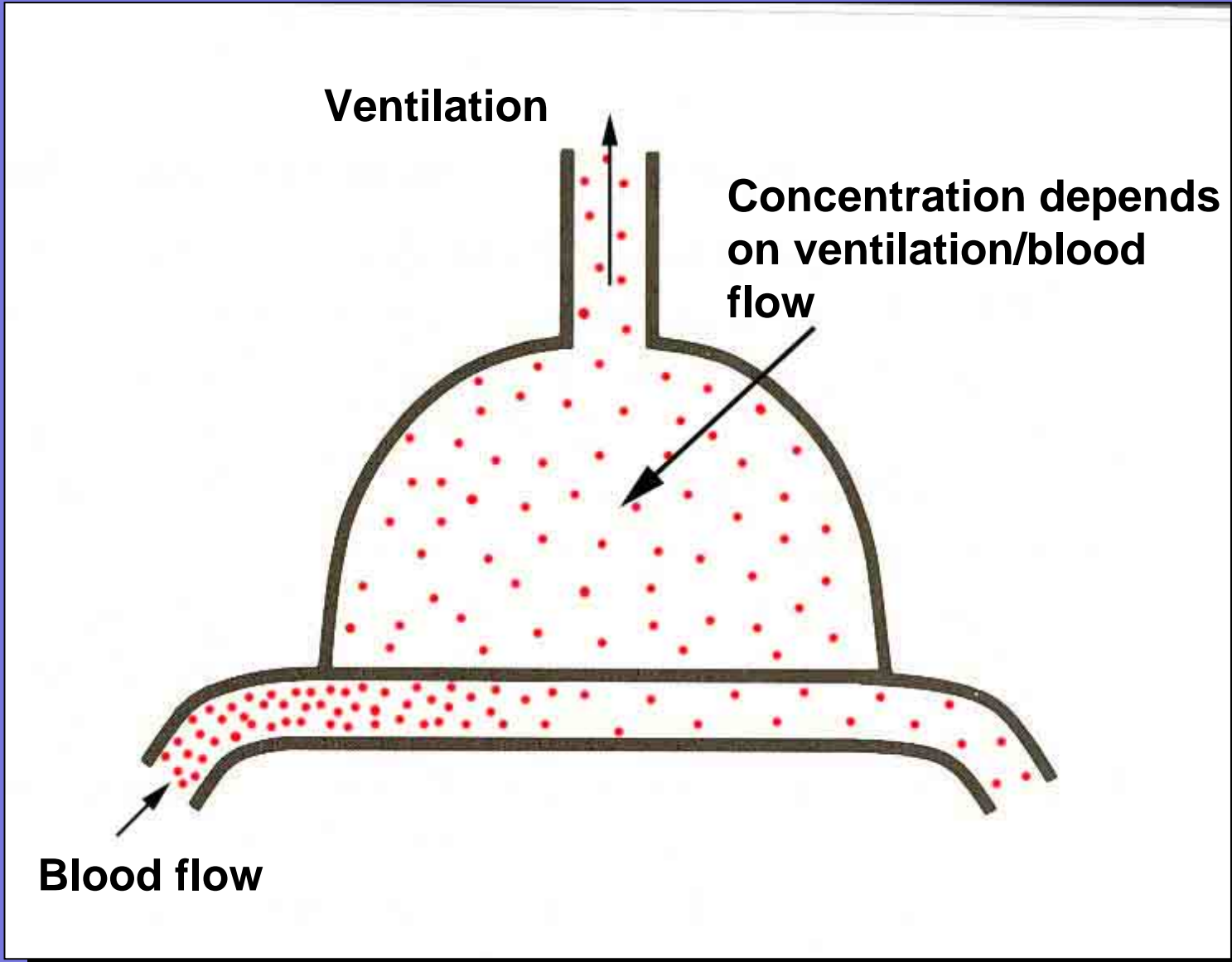


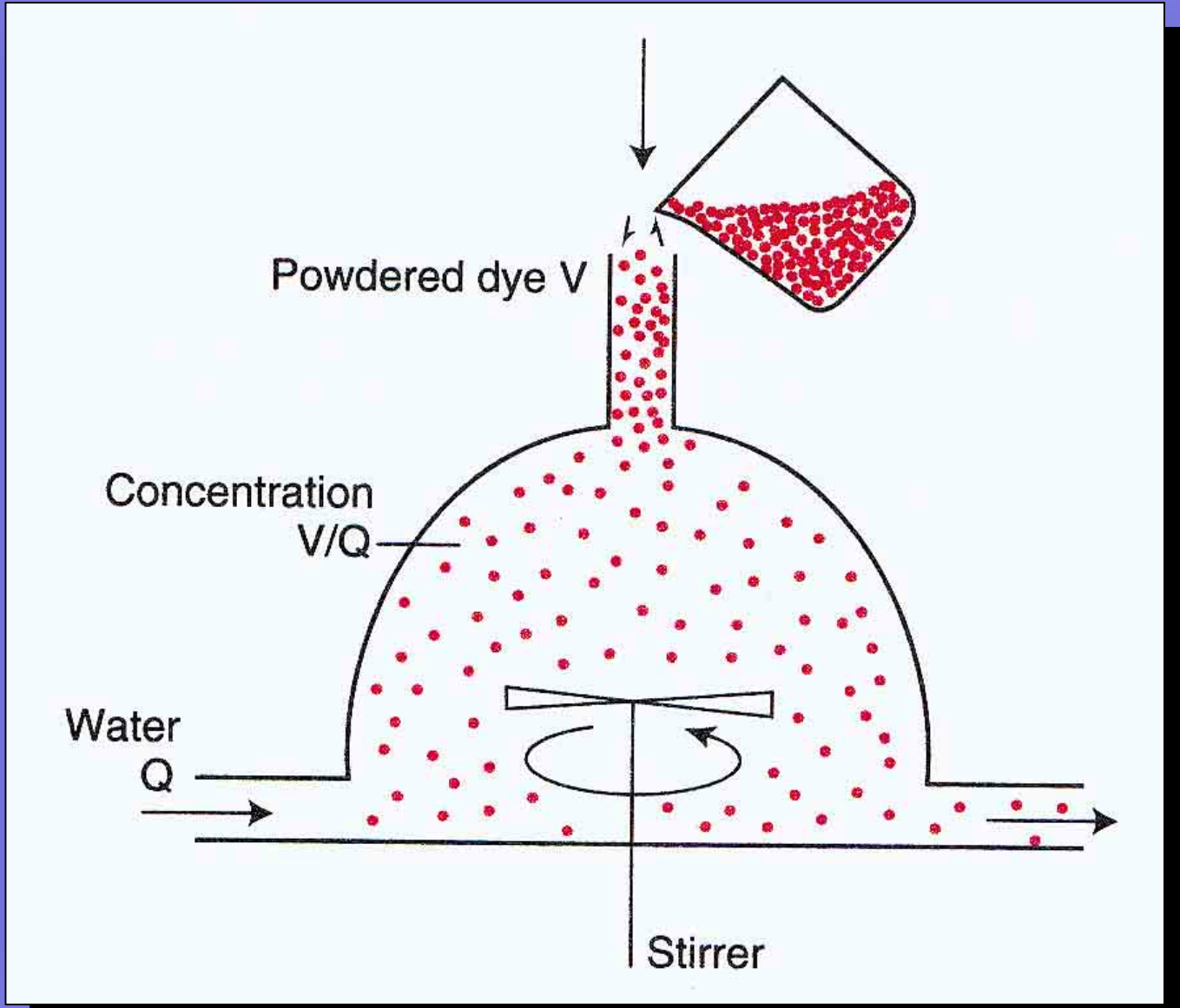




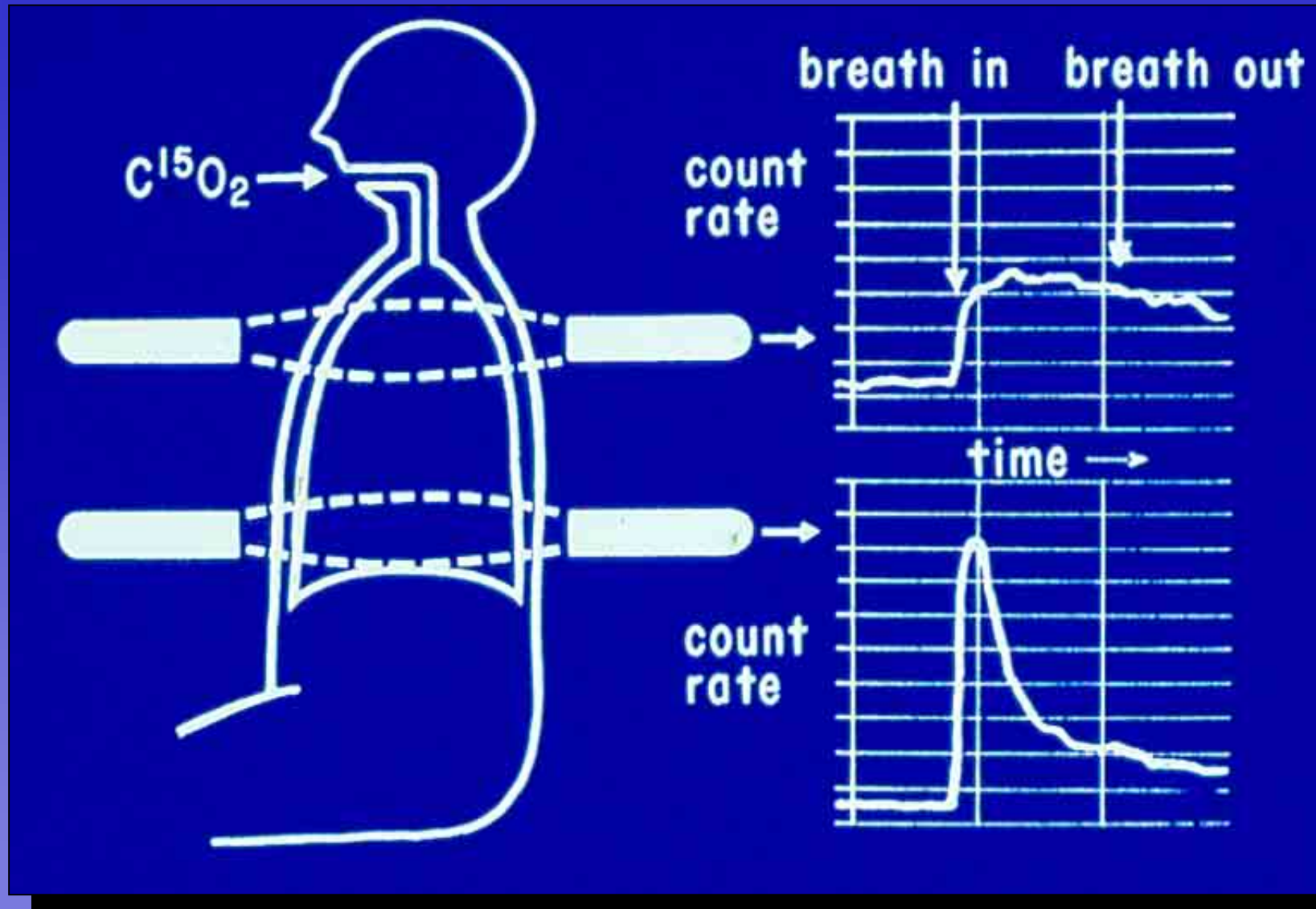




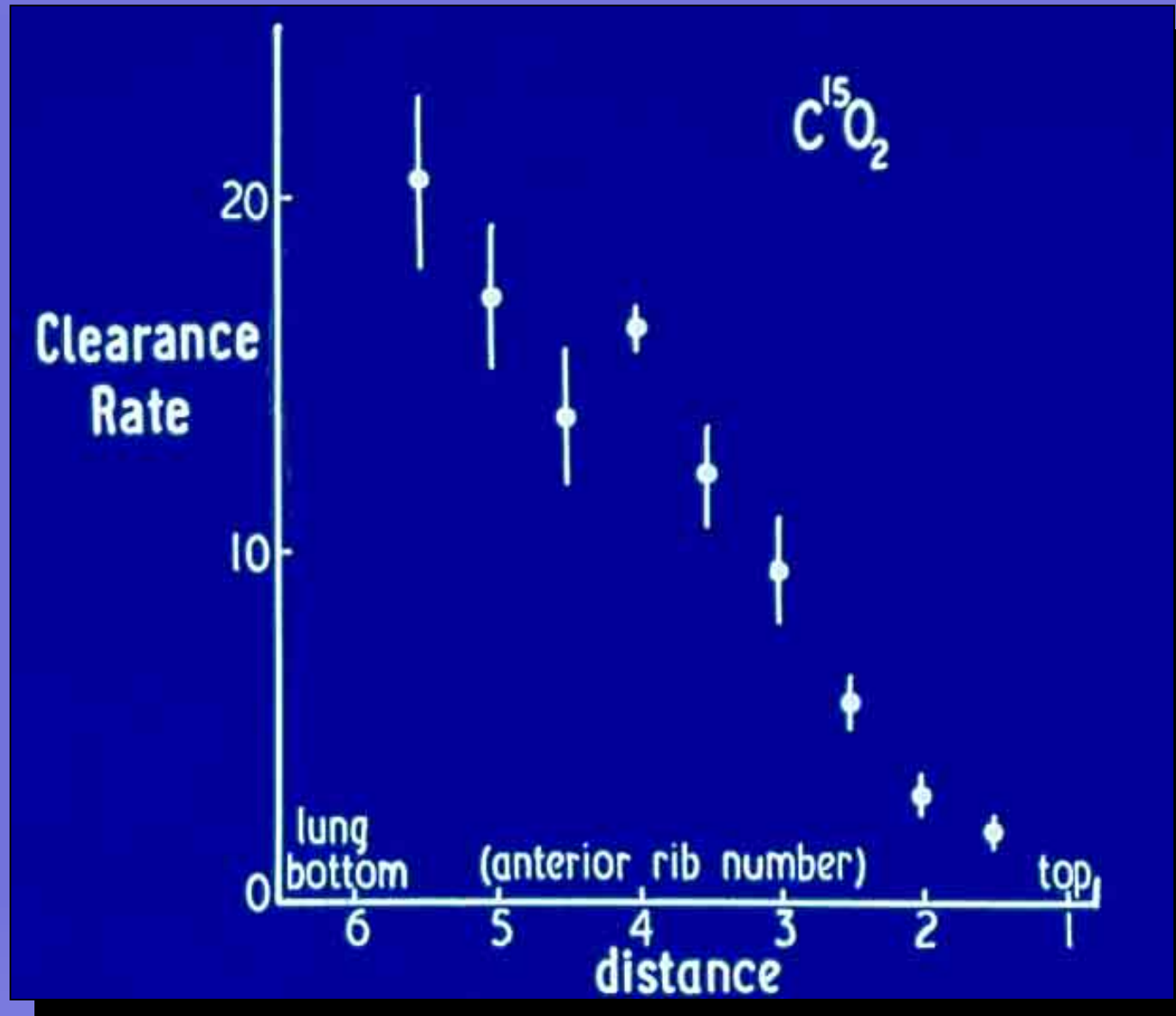




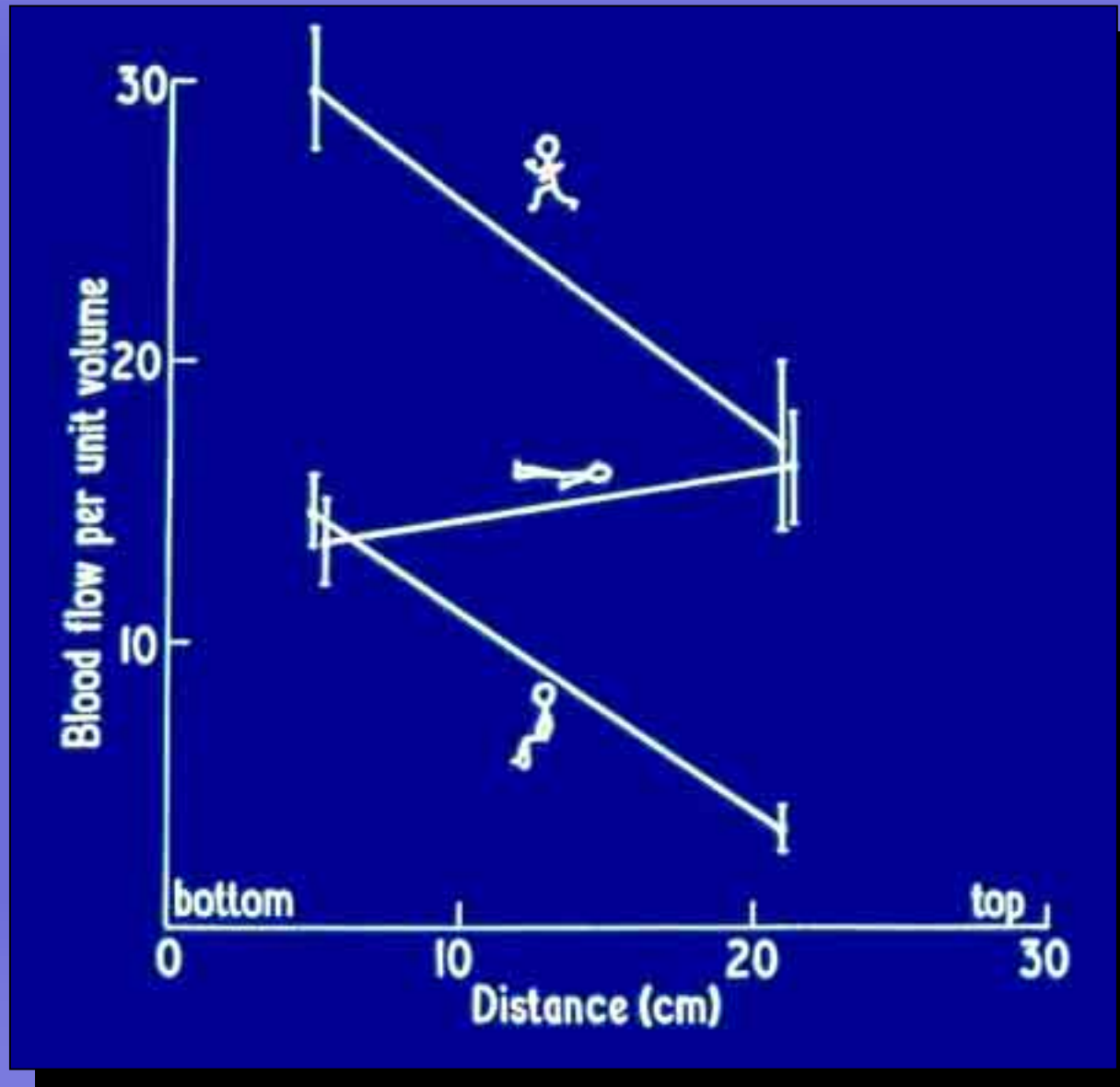
Regional Blood Flow Measured with Radioactive CO₂



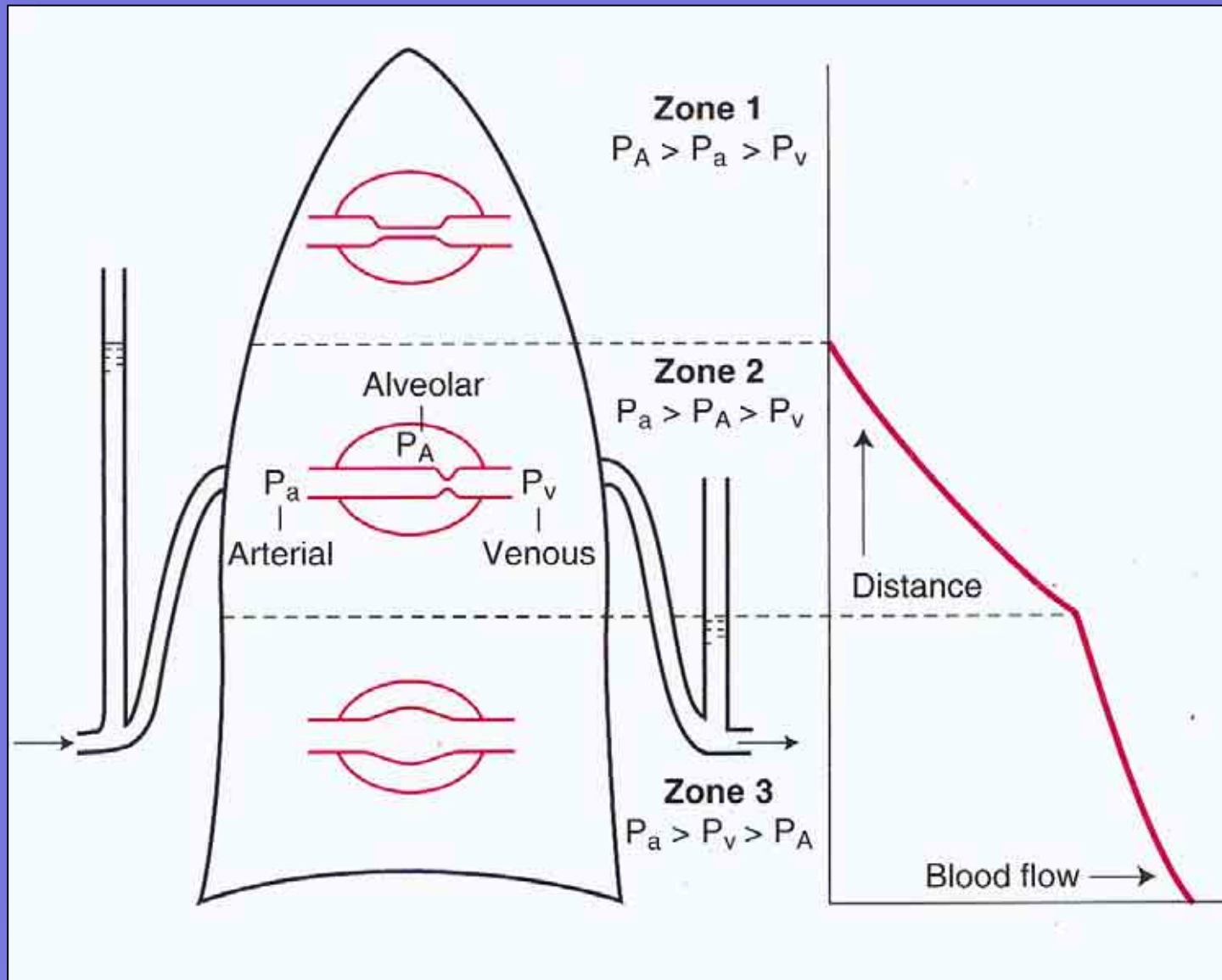
Clearance Rate of Radioactive CO_2 at Different Lung Heights



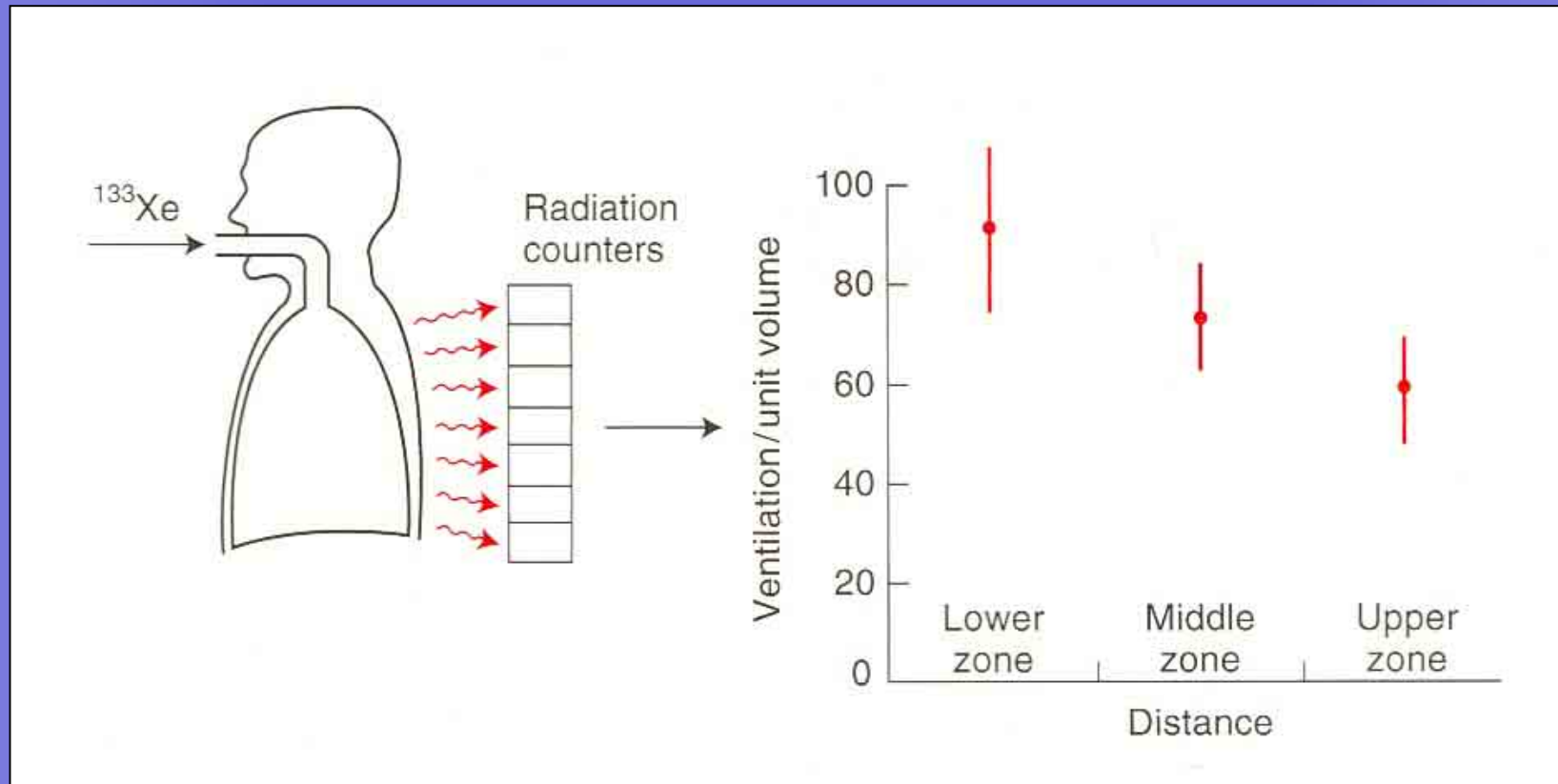
Effect of Posture and Exercise on Regional Blood Flow



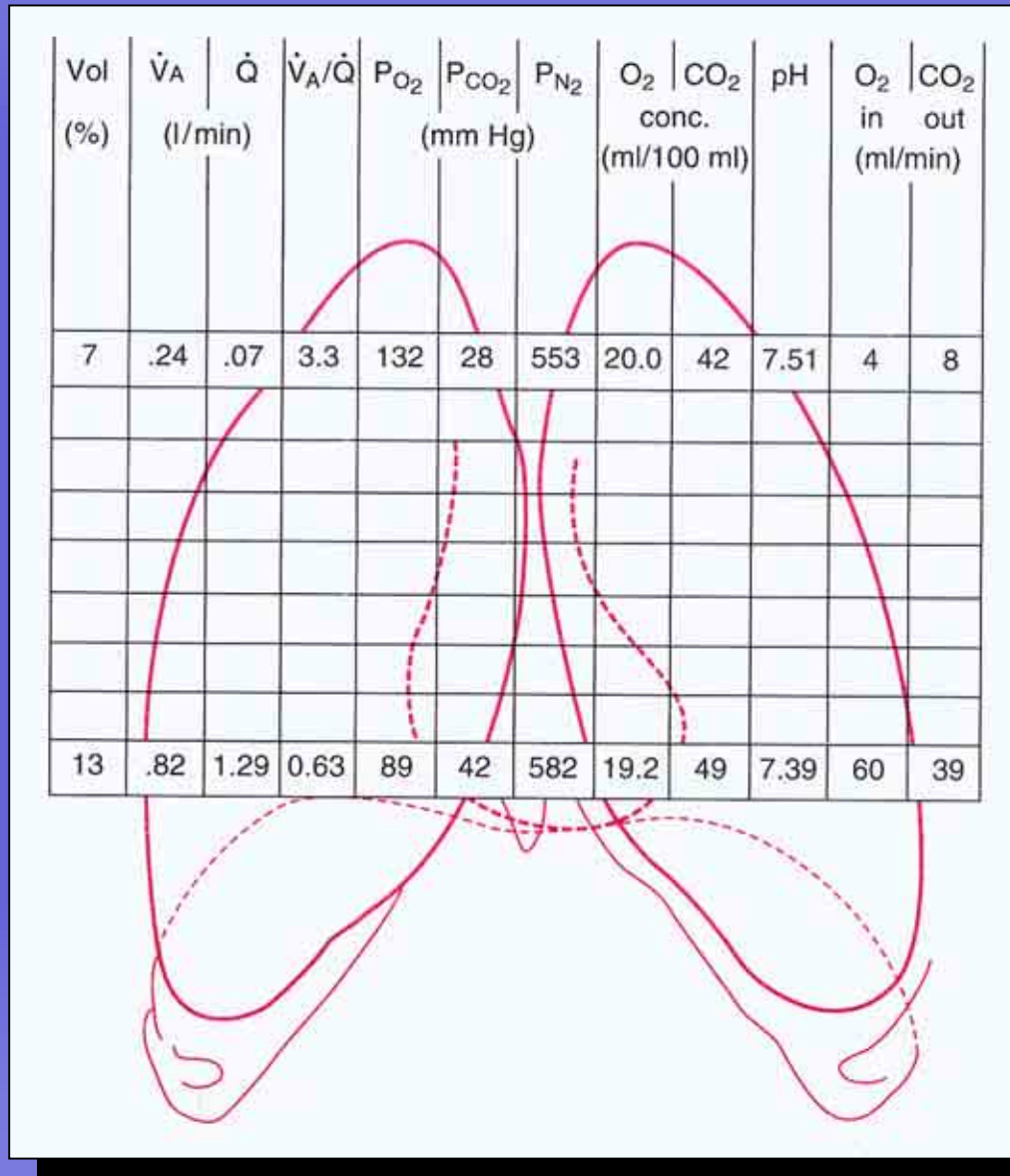
Three Zone Model of Regional Blood Flow



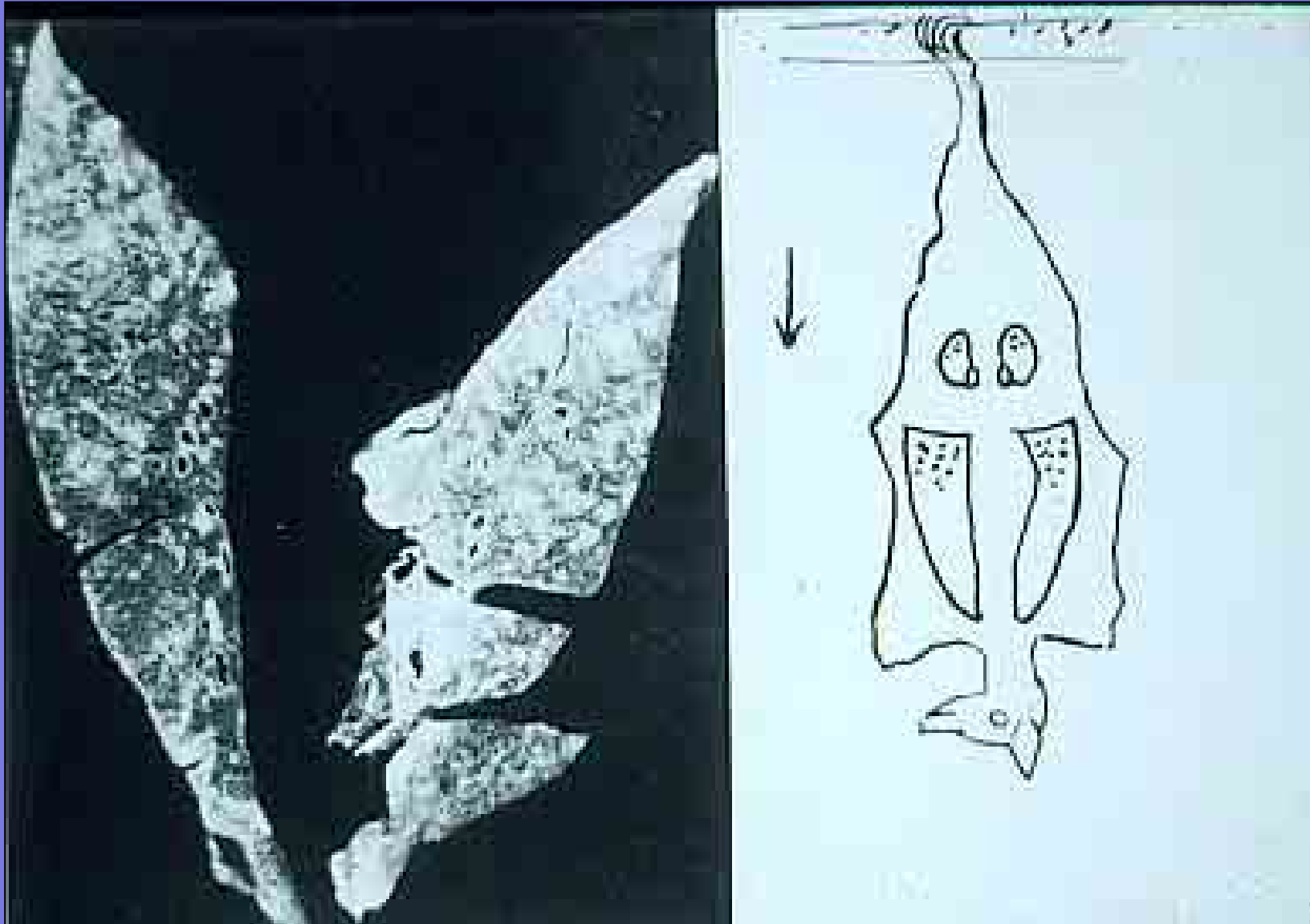
Regional Ventilation Measured with Radioactive Xenon



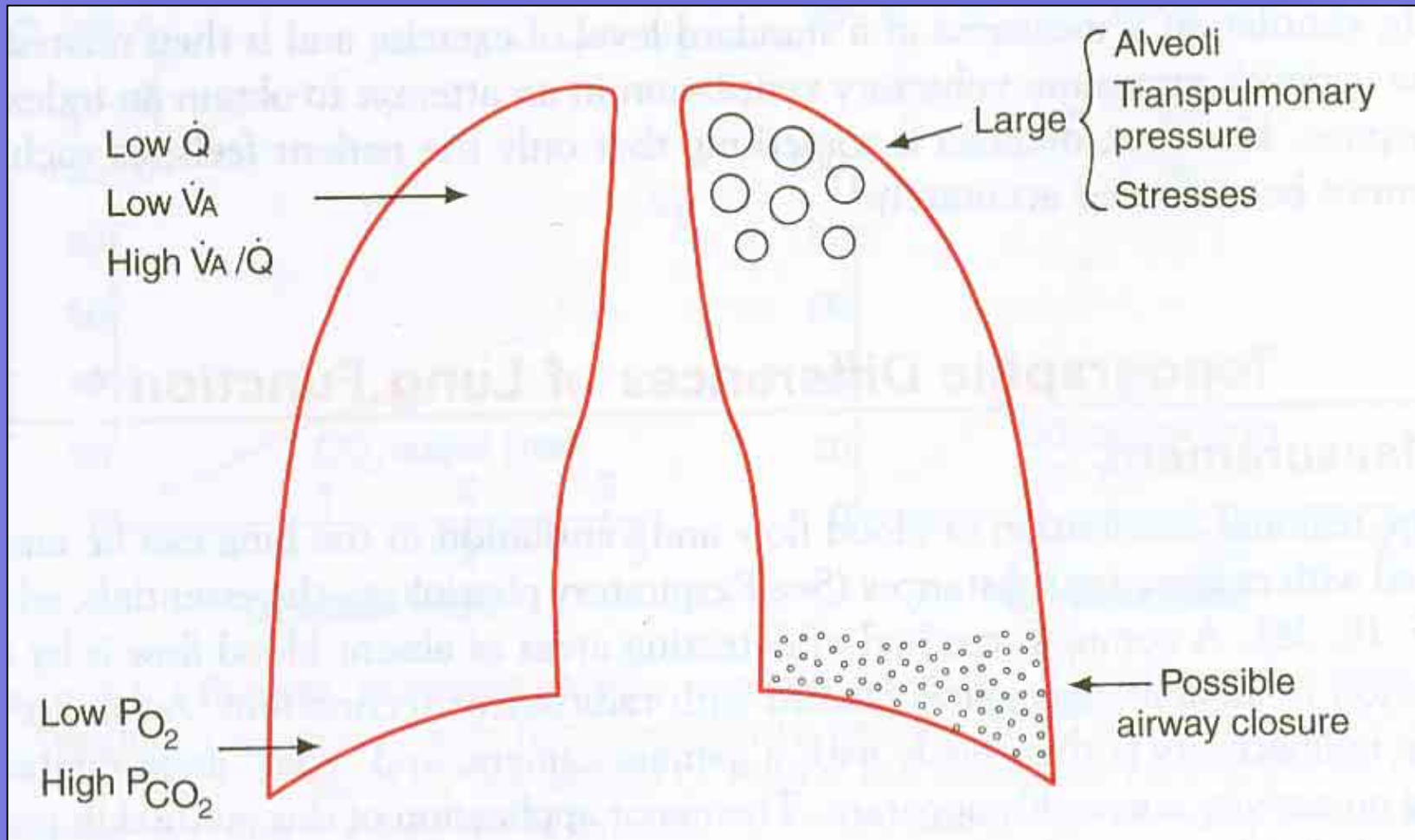
Regional Differences of Gas Exchange

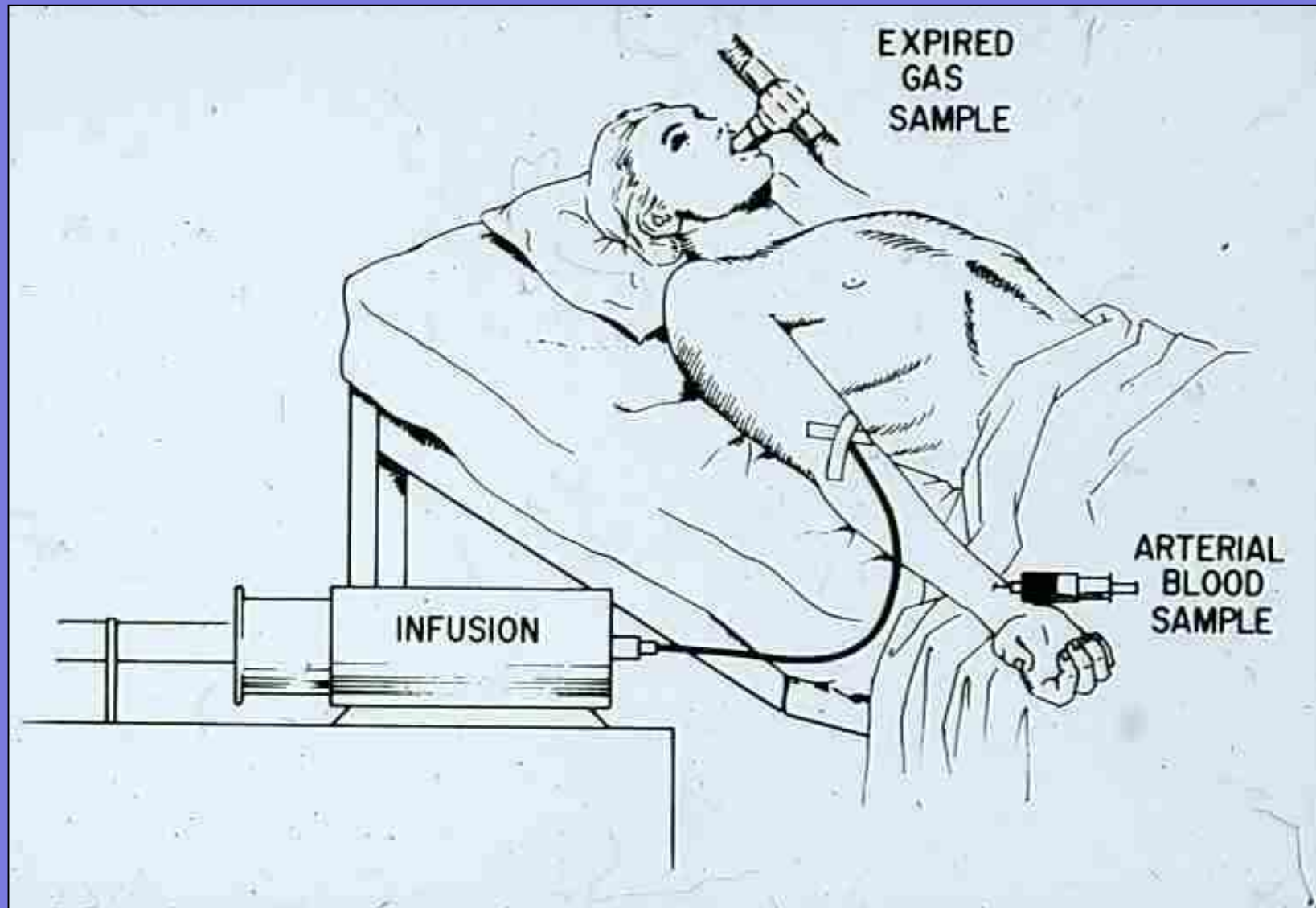


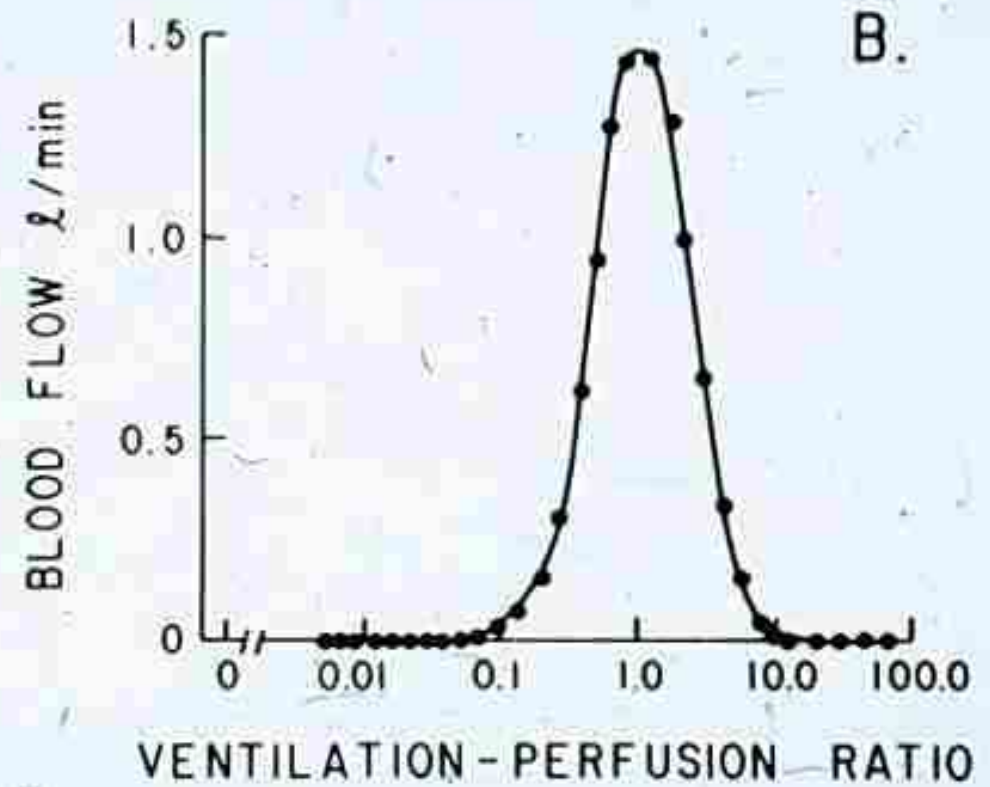
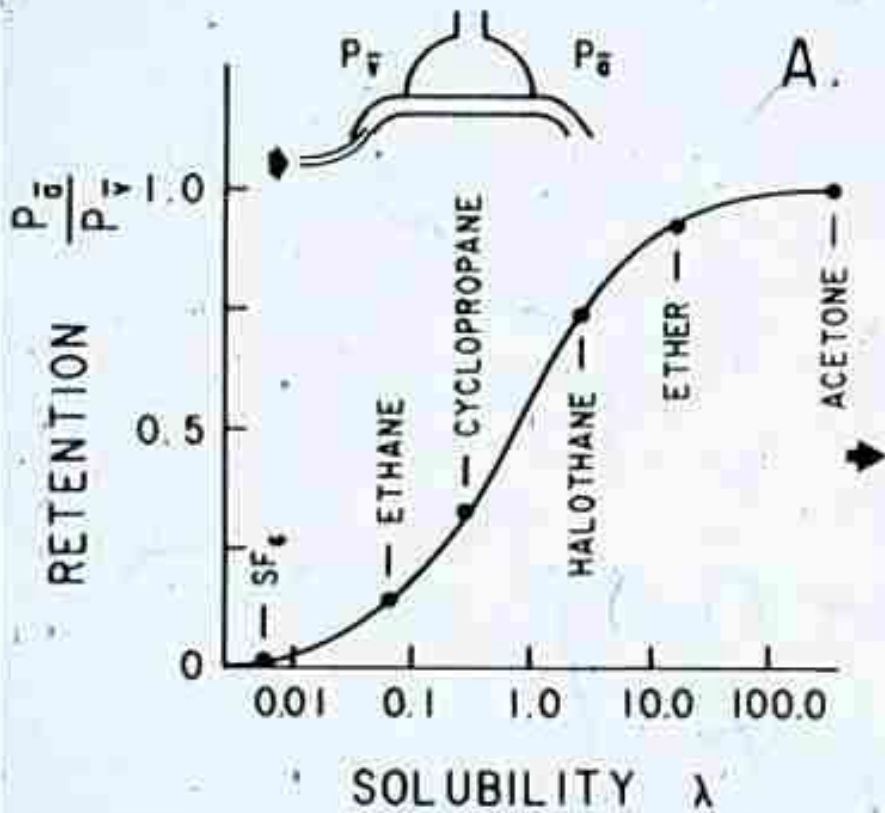
Localization of Pulmonary TB in the Bat



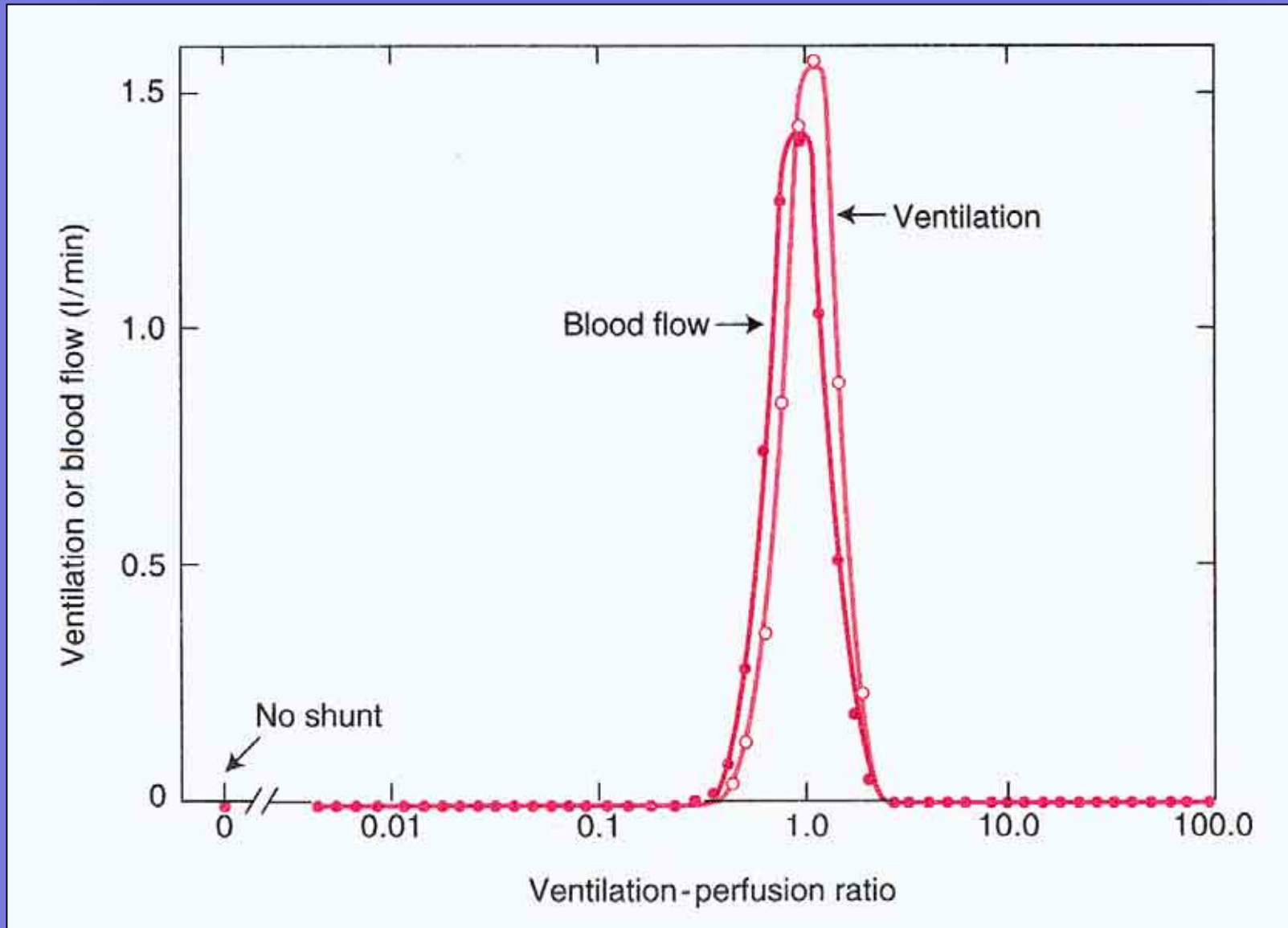
Summary of Regional Differences in the Lung







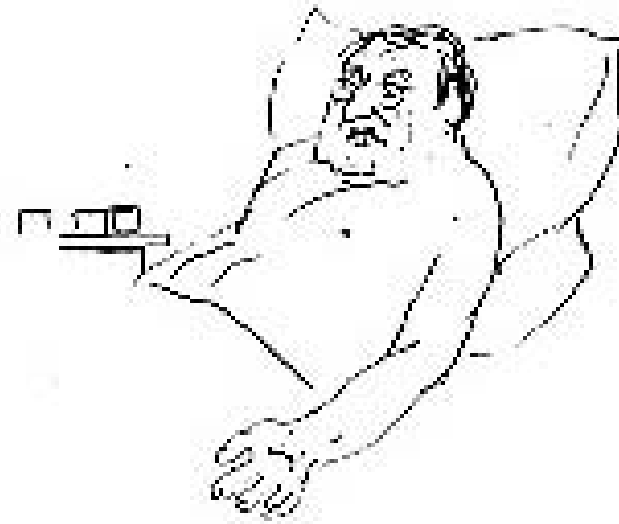
Distribution in a Young Normal Subject



Patient Types in Chronic Obstructive Pulmonary Disease

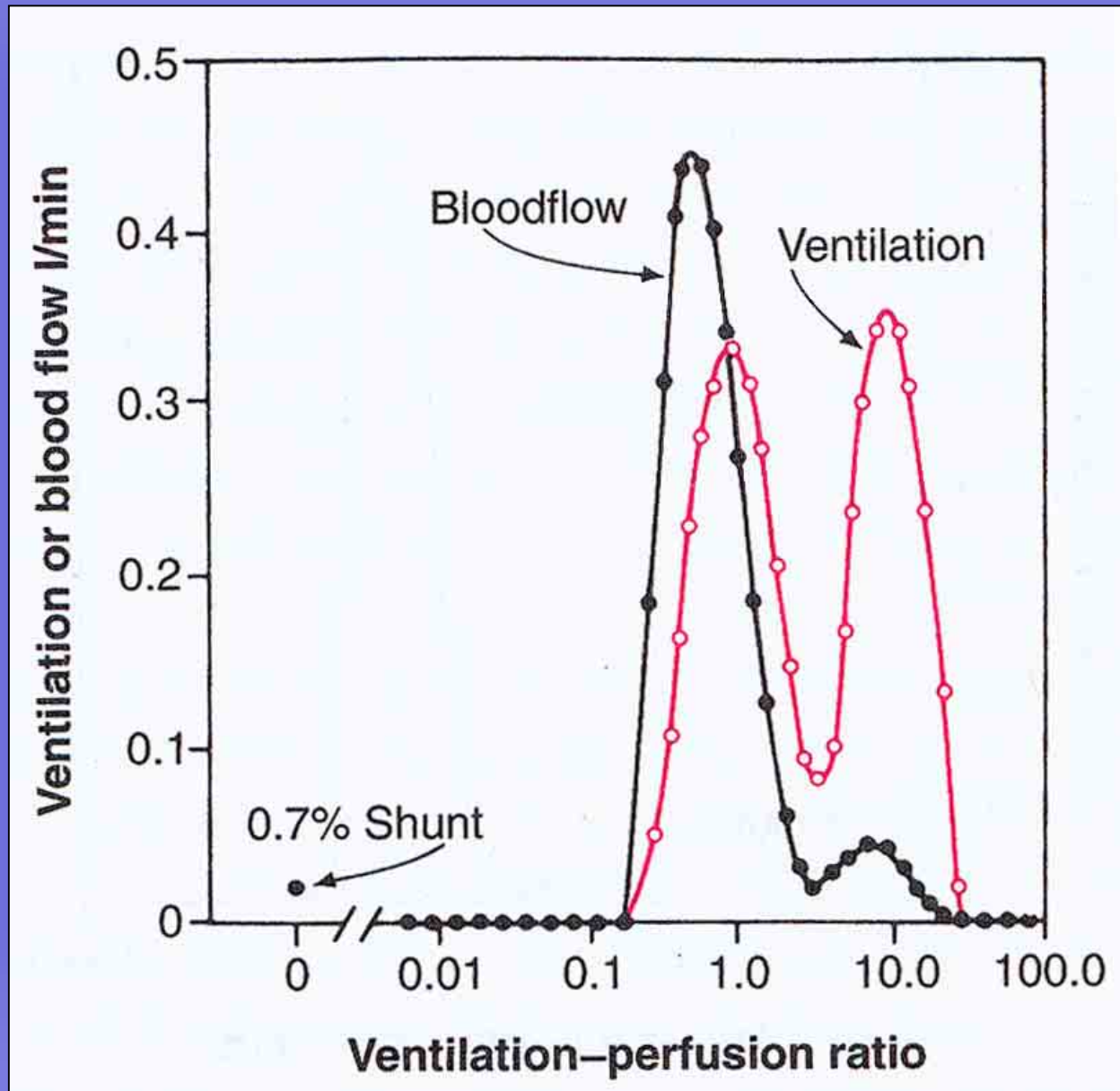


Type A

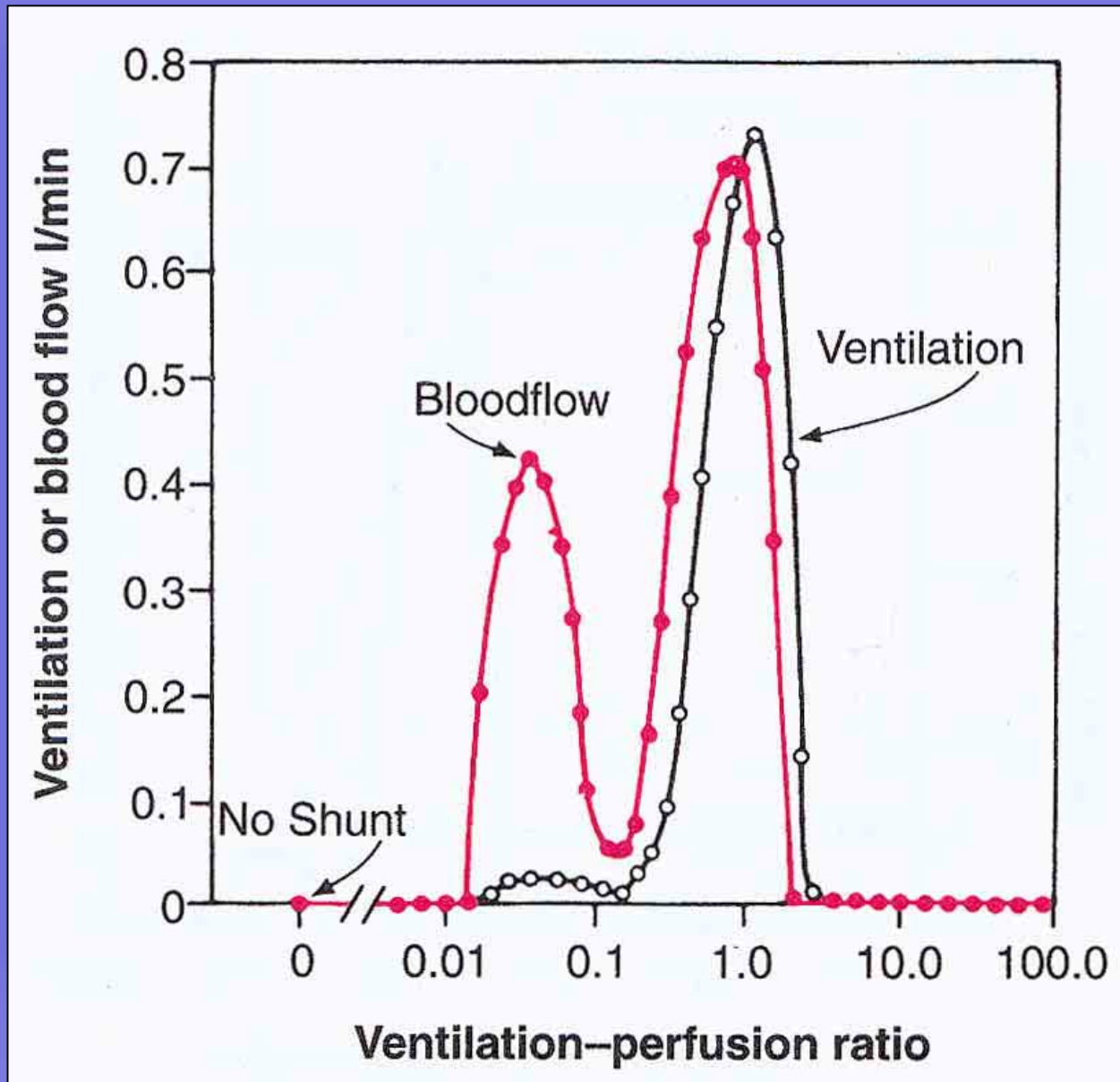


Type B

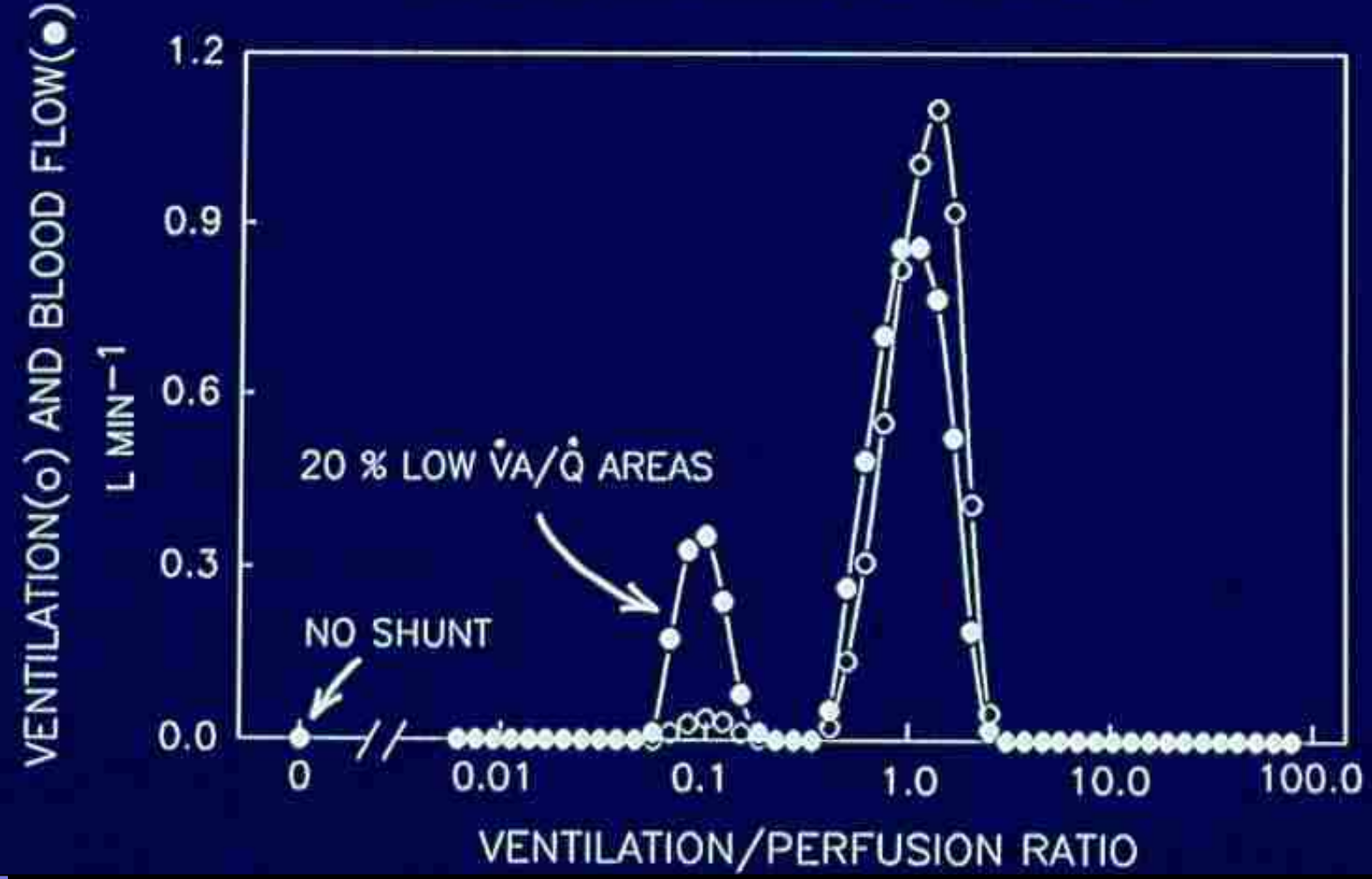
Typical Distribution in Type A COPD

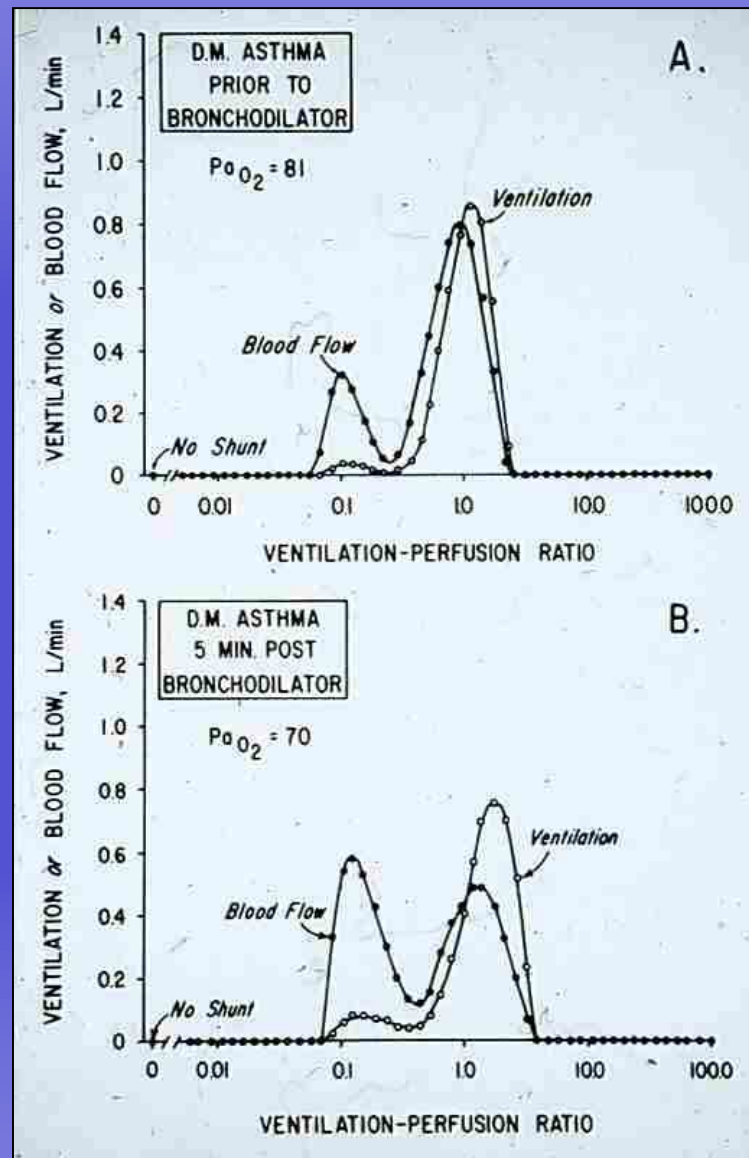


Typical Distribution in Type B COPD



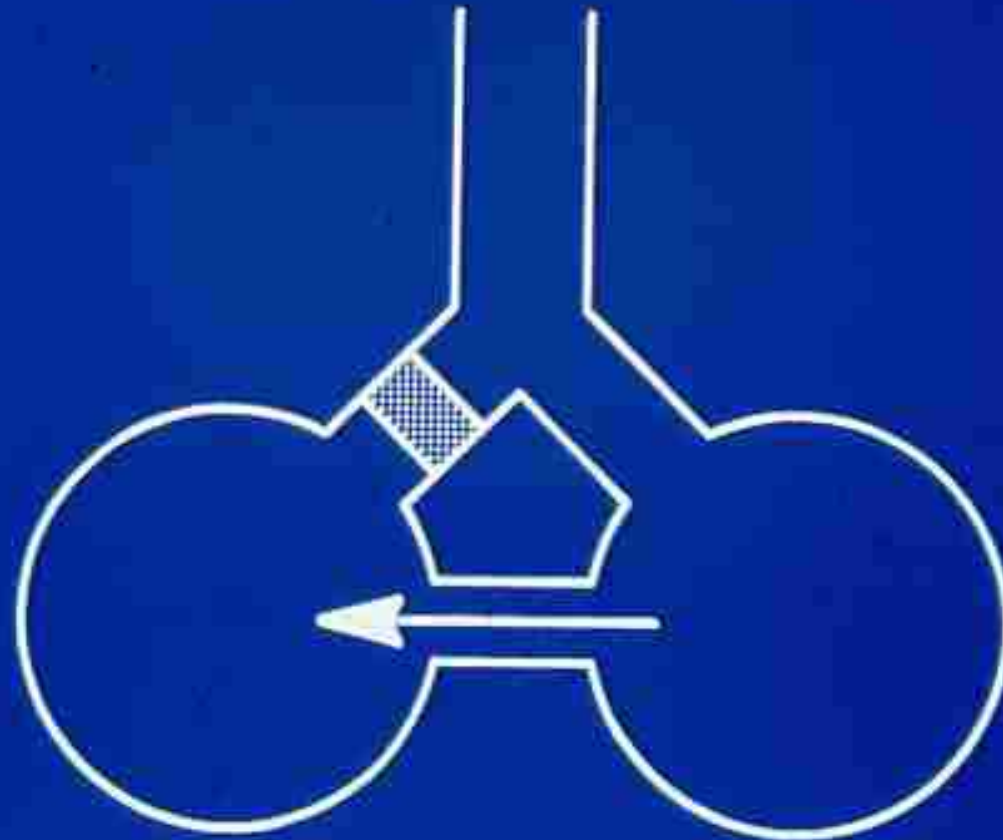
TYPICAL PATTERN IN ASTHMA



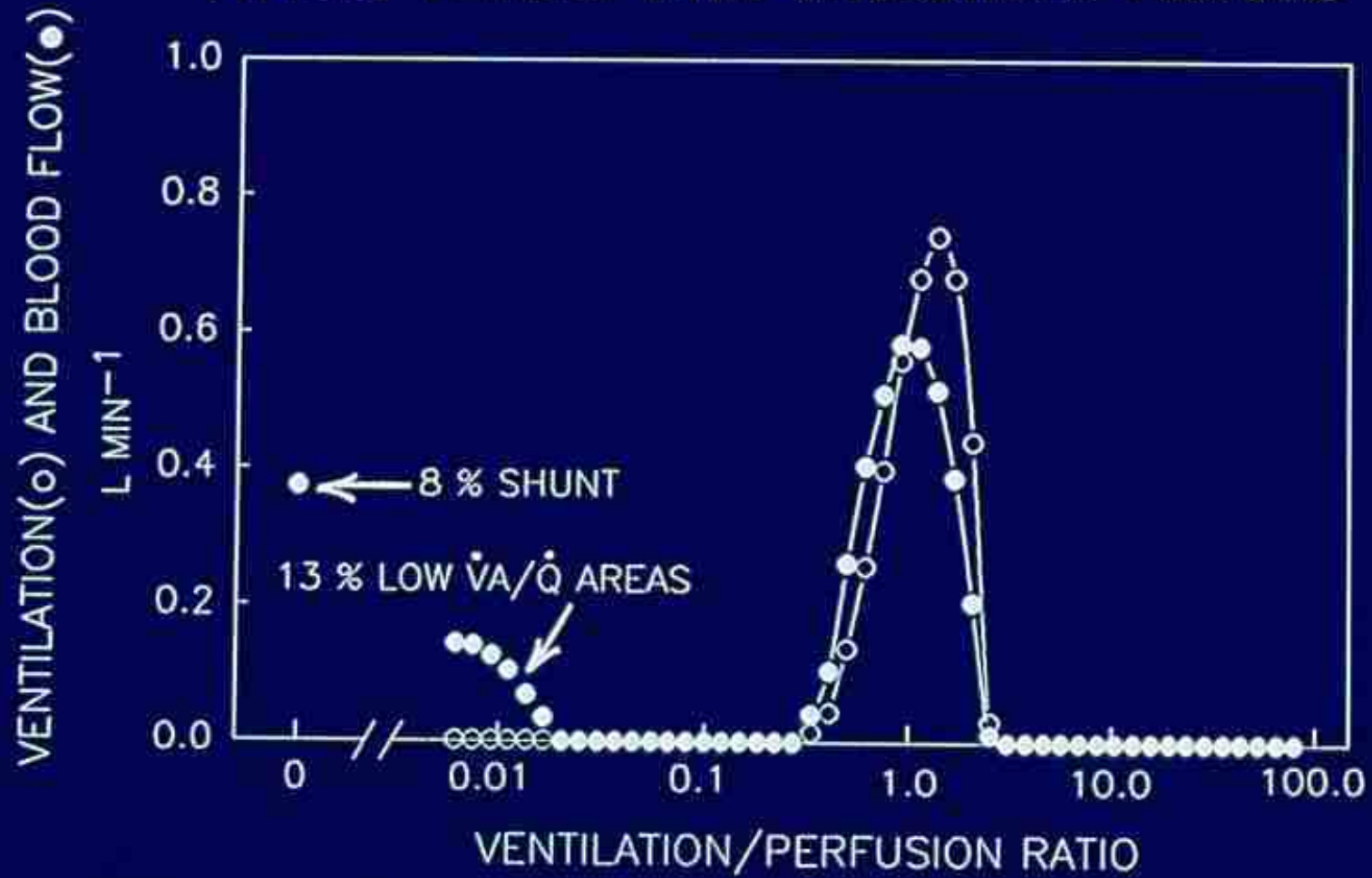


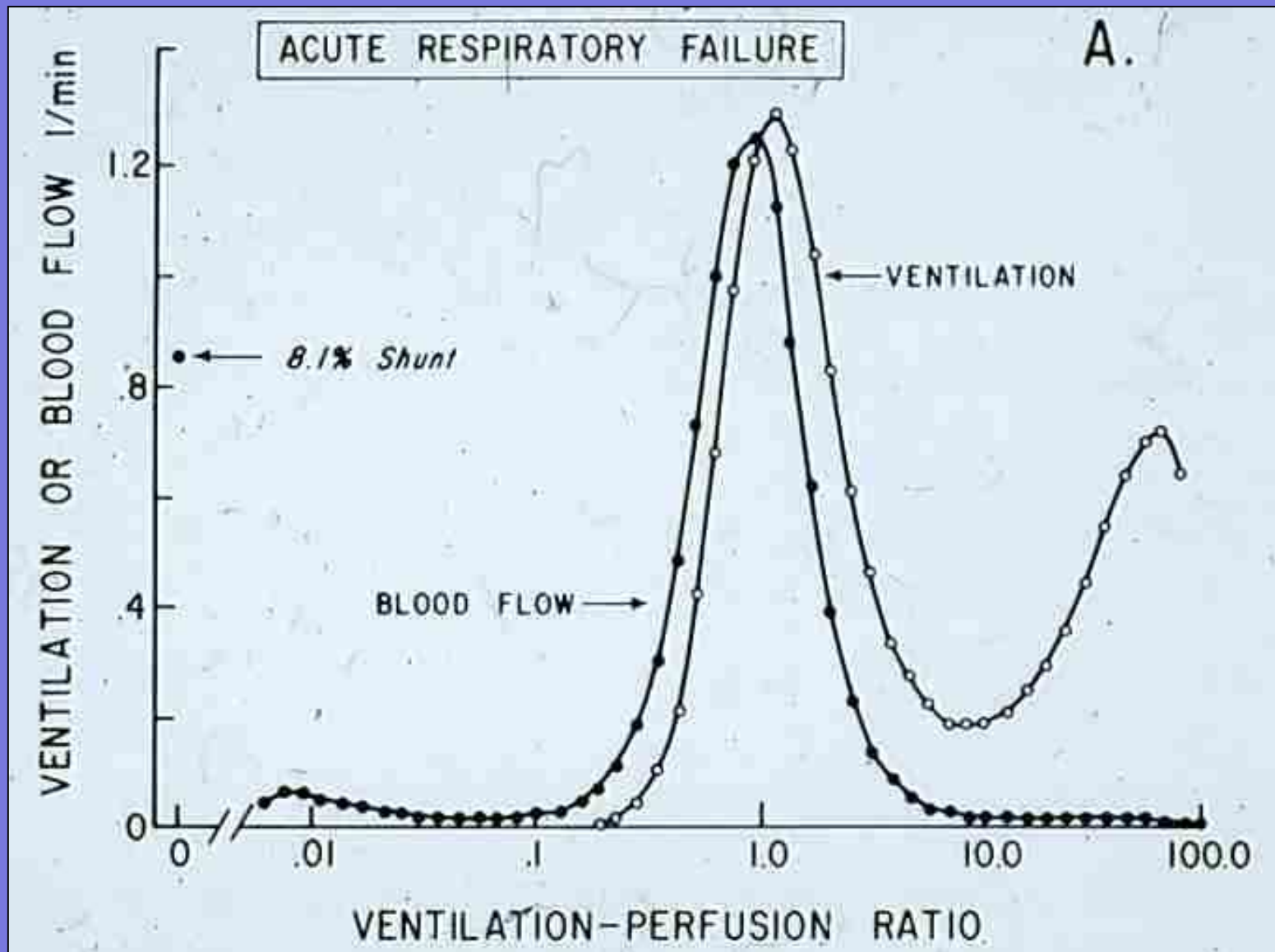
Collateral Ventilation

1-32



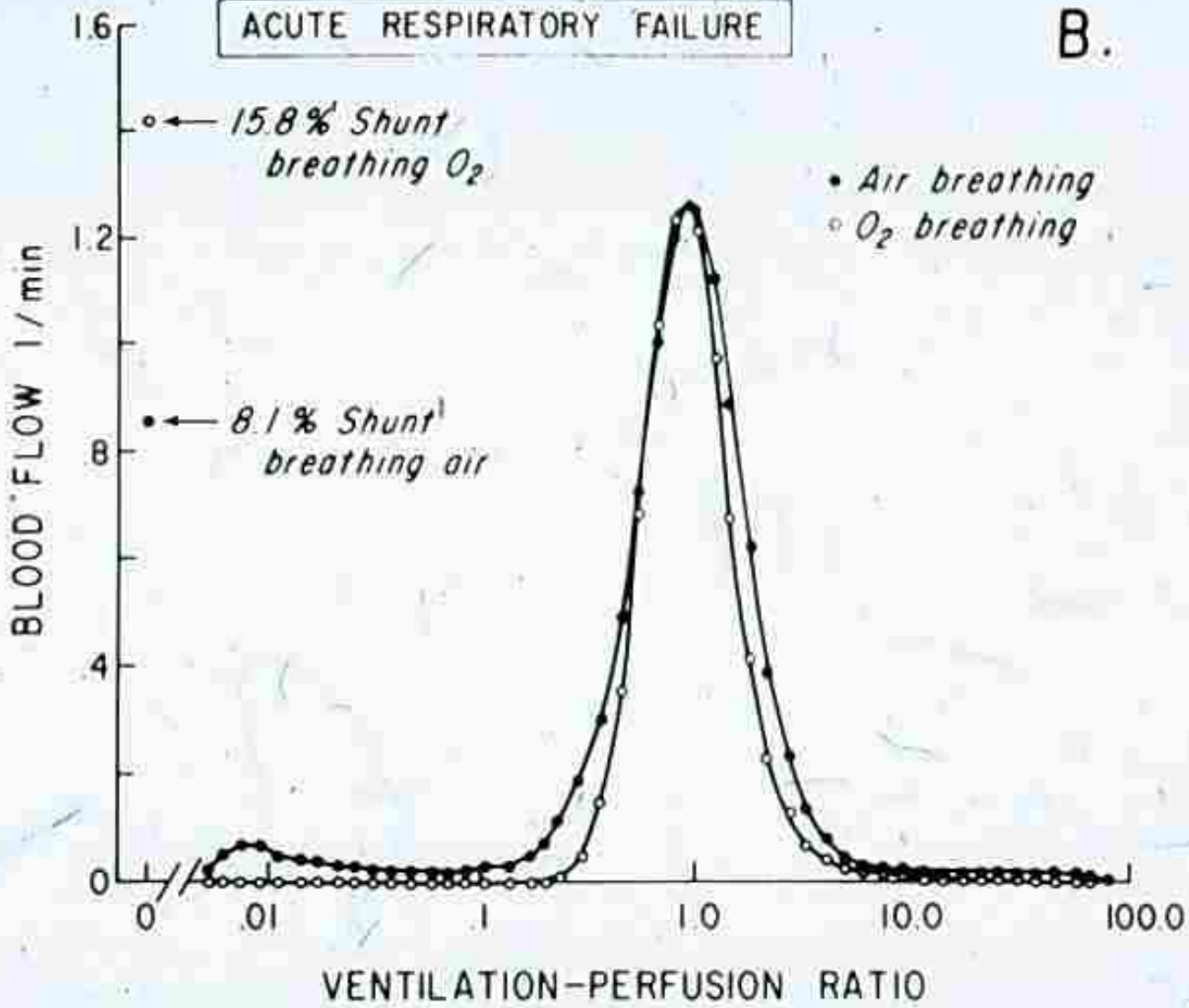
TYPICAL PATIENT WITH INTERSTITIAL FIBROSIS

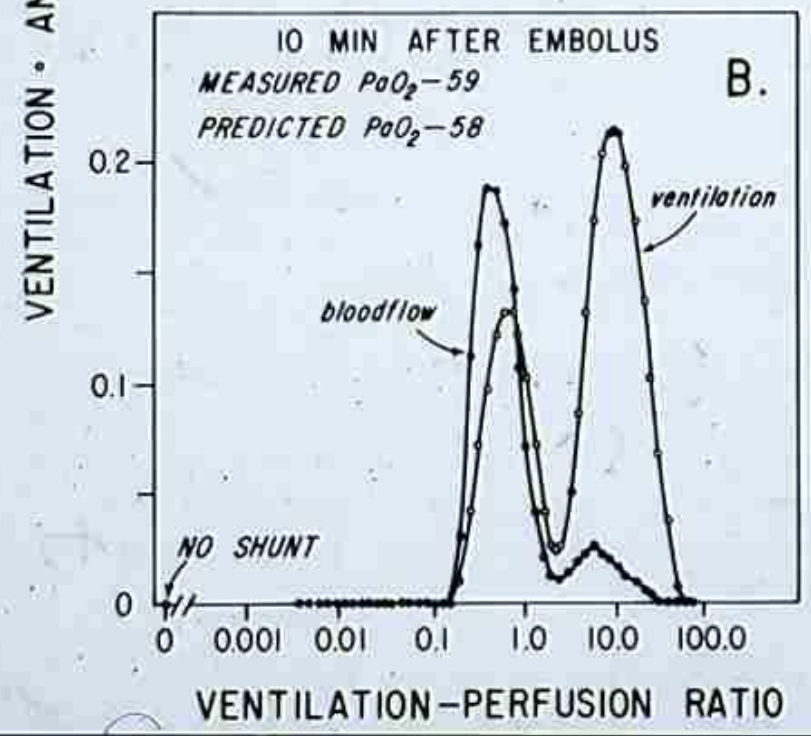
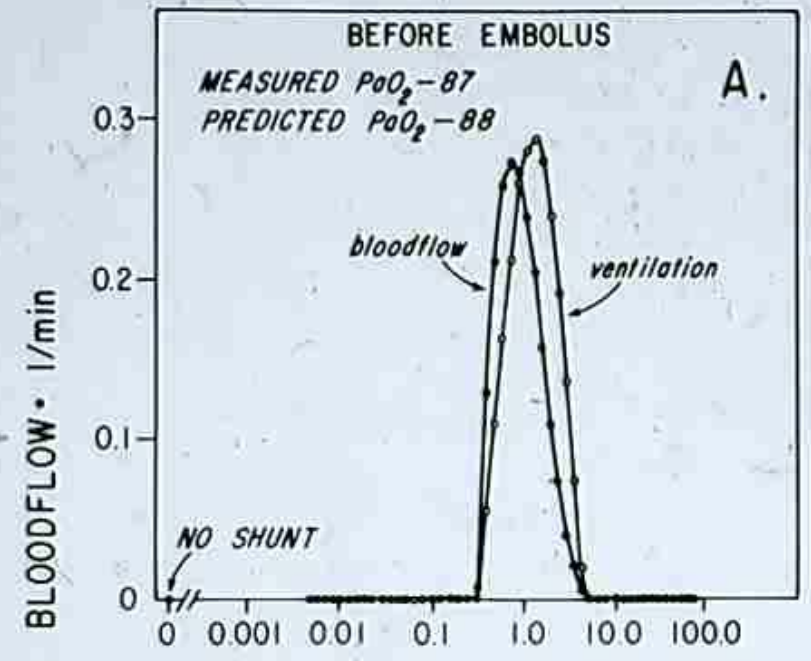




ACUTE RESPIRATORY FAILURE

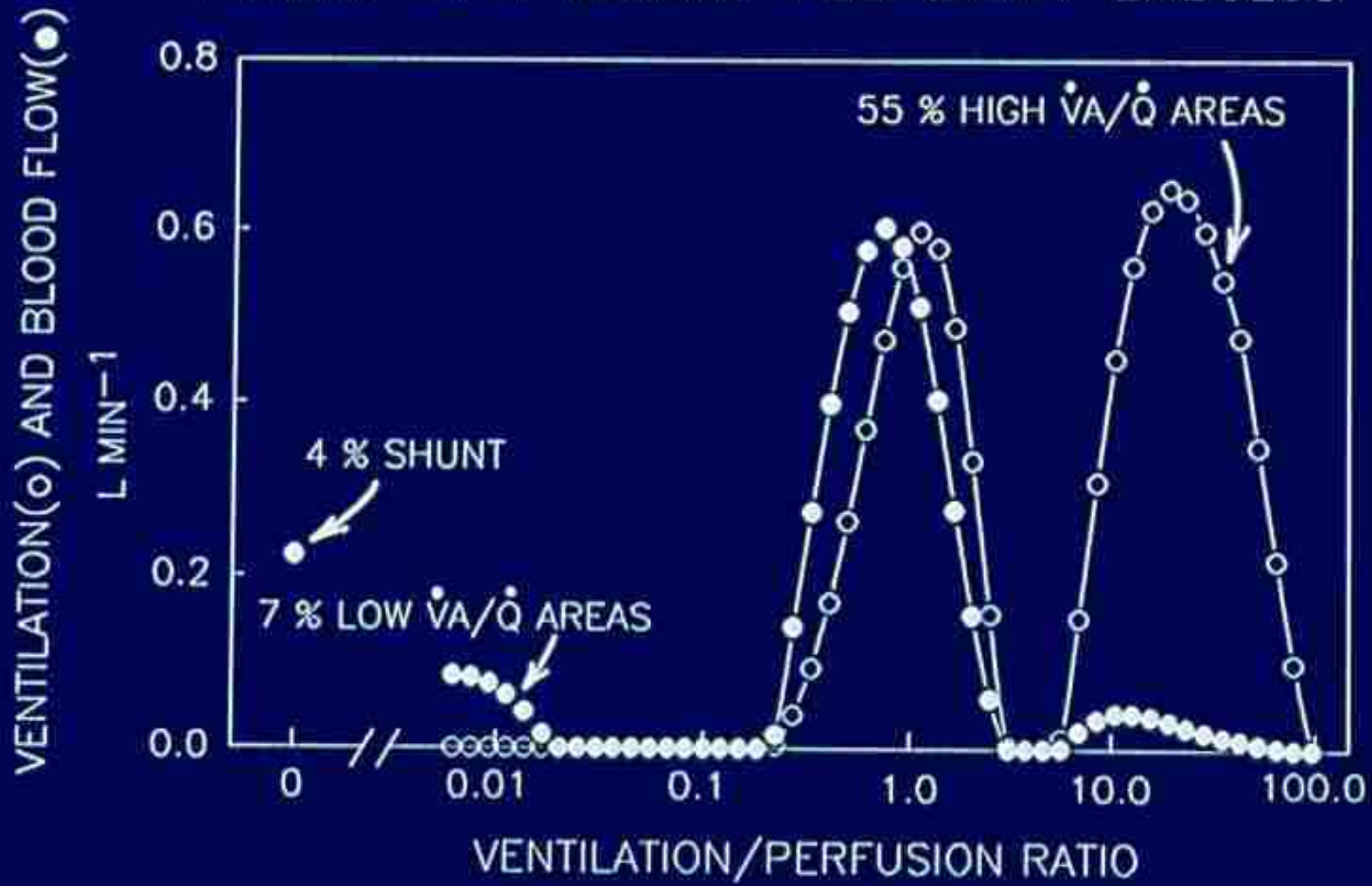
B.

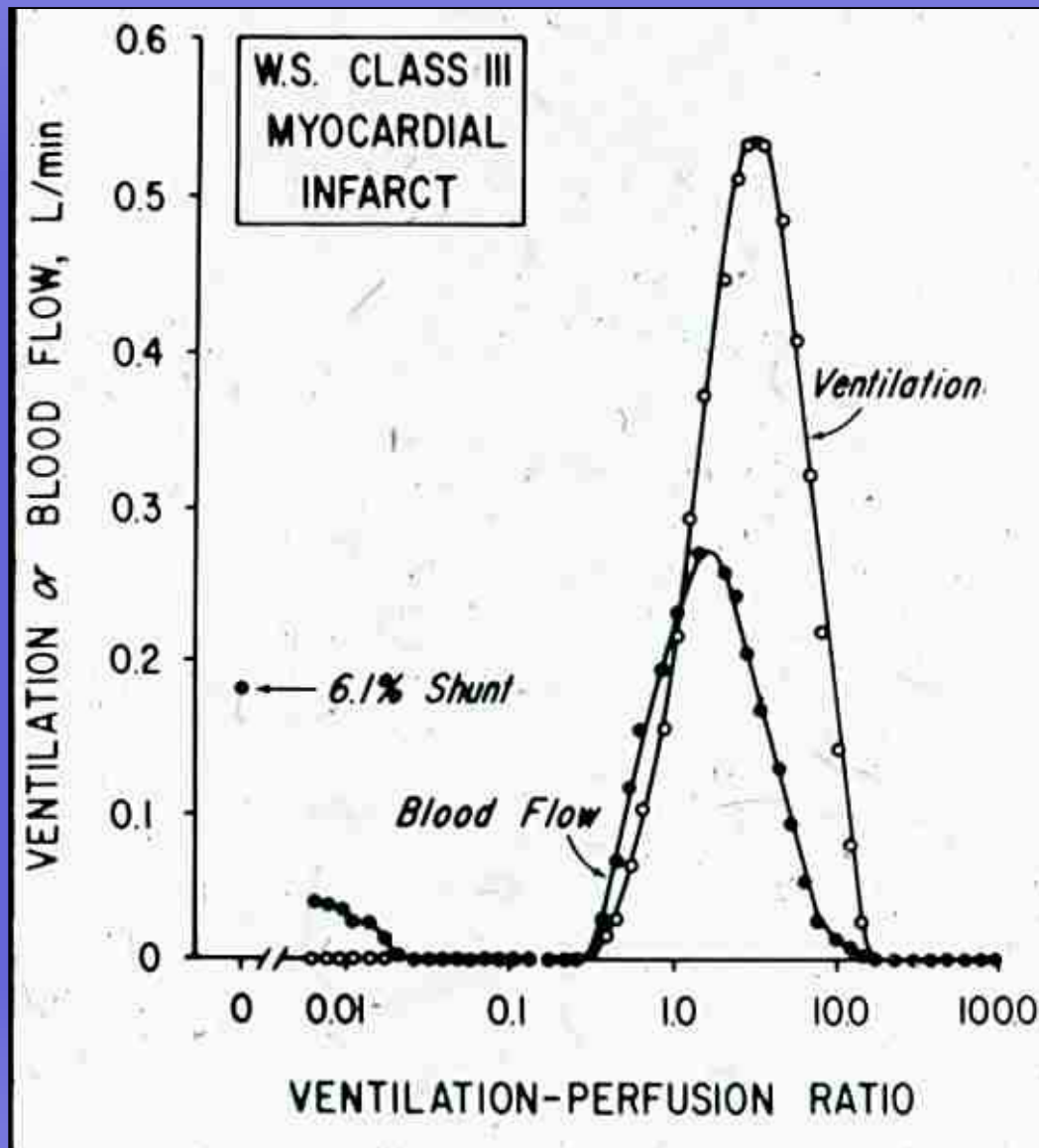




VENTILATION-PERFUSION RATIO

PATIENT WITH SEVERE PULMONARY EMBOLUS





Summary

- 1) **Four causes of hypoxemia: hypoventilation, diffusion limitation, shunt, and ventilation-perfusion inequality**
- 2) **Blood flow increases down the normal upright human lung because of gravity**
- 3) **Ventilation also increases down normal upright lung because of gravity**
- 4) **These regional differences of ventilation and blood flow result in a pattern of gas exchange in the normal lung**

Summary

- 5) In patients with lung disease there is usually no topographical pattern but information can be obtained from the multiple inert gas elimination technique
- 6) Examples of the distribution of ventilation-perfusion ratios have been shown in a variety of diseases including COPD, asthma, interstitial lung disease, ARDS, and pulmonary embolism
- 7) Ventilation-perfusion inequality is responsible for most of the impairment of gas exchange in patients with lung

