

Gas Exchange

Biology

The features that make an exchange surface efficient, and where they appear.

Fick's law in practice.

Feature	Why	In the lung
Large surface area	More diffusion at once	~70 m ² of alveoli
Thin barrier	Shorter diffusion path	One cell thick
Steep gradient	Faster diffusion	Ventilation and circulation maintain it
Good blood supply	Removes the diffused gas	Dense capillary network
Moist surface	Gases dissolve first	Surfactant lining

Fick's law: rate $\propto$ (area $\times$ concentration difference) $\div$ thickness. Every adaptation optimises one of those three terms.