# The asymmetry and the optimization degree of the airway of Rattus norvegicus and Oryctolagus cuniculus La asimetría y el grado de optimización del árbol bronquial en Rattus norvegicus y Oryctolagus cuniculus

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From a physical perspective, the air way has been proposed as a model of optimal design. Its design has been associated with a optimal gases flow to the alveoli, a minimum entropy production and minimal costs of mass and energy. The decrease of the bronchial diameter (dG) along the airway has been modeled by (i) an exponential decay of the bronchial diameter (dG) as function of its generation: $dG = do \cdot 2-G/3$, associated to a minimum entropy production, and (ii) a renormalization model: $dG = An \cdot G-u$ where u is an exponent and An an harmonic function which introduces periodic variations in the scale, buffering the propagation of stochastic errors in the bronchial diameter. However, that the last result in asymmetric trees may be a consequence of a real relationship between diameter and order more than a relationship diameter-generation. In this work we explore this hypothesis in two species. We also use the Zamir model for vascular trees as an out method to explore the optimality degree of