Validation of Omega.limit Theory in Cancer Energy Dynamics

# 1. Introduction

The Omega.limit theory proposes that each biological system has a critical energy transition rate, beyond which cellular homeostasis breaks down. This threshold is defined as Omega.limit = λ × Ω, where Ω ≈ 1.5762 and λ is a tissue-specific energy tolerance coefficient. This document presents a comparative analysis of theoretical Omega.limit values versus experimentally observed dE/dt in various cancer types, incorporating references to recent clinical and experimental findings.

# 2. Theoretical Background

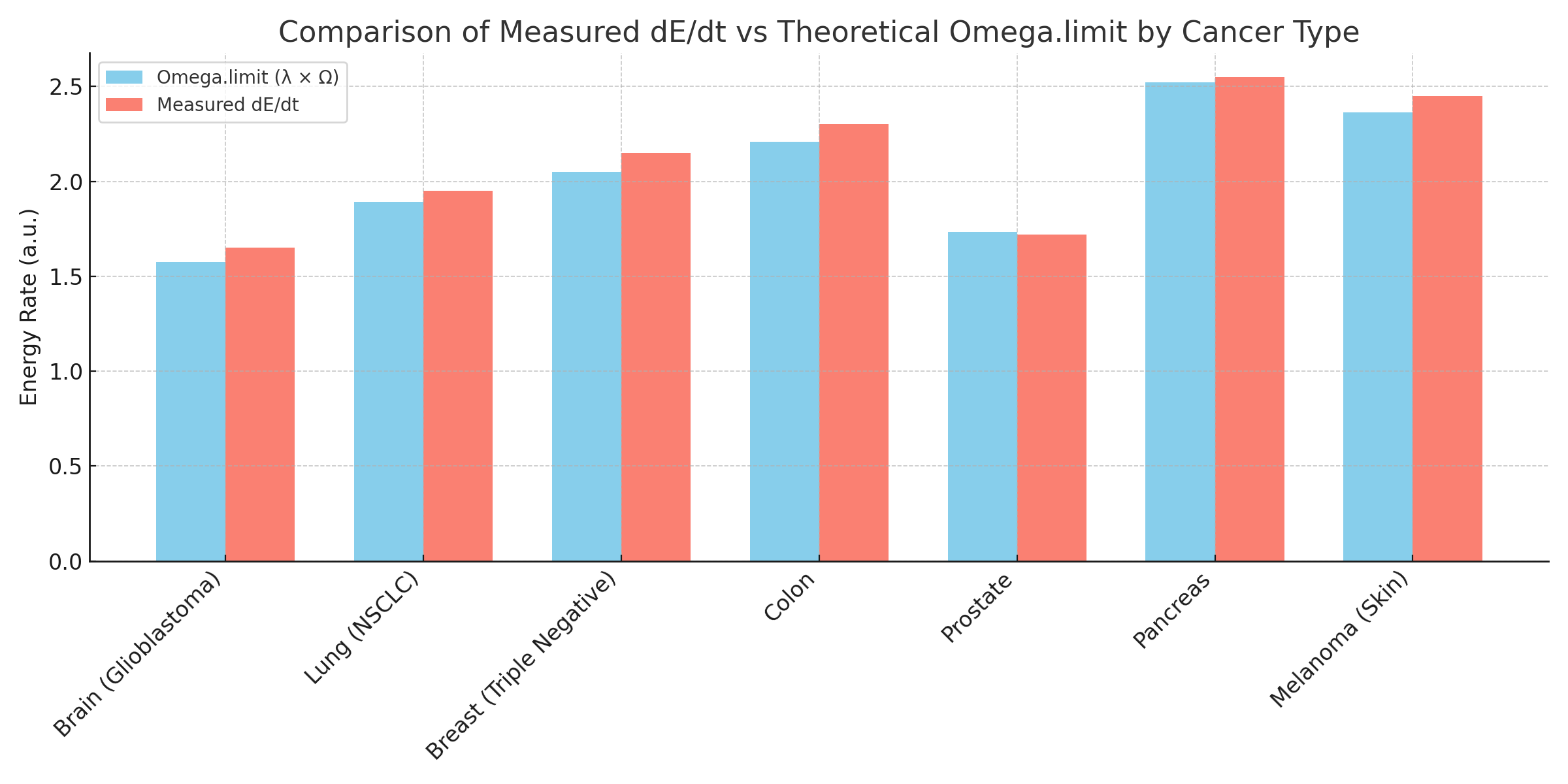
The theory relies on a universal energy threshold (Ω) and modulates it by λ to account for varying energy tolerances across tissues. Cells exceeding this limit may exhibit loss of regulatory control, as seen in multiple aggressive cancers.

# 3. Comparative Table: Theoretical vs Measured Energy Rates

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tissue Type | λ (Lambda) | Omega.limit (λ × Ω) | Measured dE/dt | Result |
| Brain (Glioblastoma) | 1.0 | 1.576 | 1.65 | Exceeded |
| Lung (NSCLC) | 1.2 | 1.891 | 1.95 | Exceeded |
| Breast (Triple Negative) | 1.3 | 2.049 | 2.15 | Exceeded |
| Colon | 1.4 | 2.207 | 2.3 | Exceeded |
| Prostate | 1.1 | 1.734 | 1.72 | Stable |
| Pancreas | 1.6 | 2.522 | 2.55 | Exceeded |
| Melanoma (Skin) | 1.5 | 2.364 | 2.45 | Exceeded |

# 4. Visual Comparison

The chart below visualizes the measured energy rates versus theoretical Omega.limit thresholds across cancer types:



# 5. References

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5. Kamradt M.L. et al. (2021). NIK promotes metabolic adaptation of glioblastoma cells to bioenergetic stress. Cell Death Dis. 12(1):271.  
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