Persistence and resuscitation of *L. pneumophila*

Phenotypic heterogeneity describes dynamic variations of traits among individual cells in a clonal bacterial population (1) (**Fig. 1**). A frequent manifestation of phenotypic heterogeneity is the ratio of growing/non-growing ("dormant") cells in a population. Non-growing, metabolically active, and antibiotic resistant bacteria are called persisters. The *Legionella* quorum sensing (Lqs) system, the transcription factor LvbR and NO signaling control the phenotypic heterogeneity, persistence and virulence/motility of intracellular *L. pneumophila* in phagocytes (2-4), as well as in biofilms and microcolonies (5). Moreover, the Lqs system also regulates the frequency and timing of growth resumption ("resuscitation") on a single cell as well as on a population level (5, 6). Ongoing projects aim at elucidating the mechanisms underlying the induction of persistence and resuscitation of *L. pneumophila*.

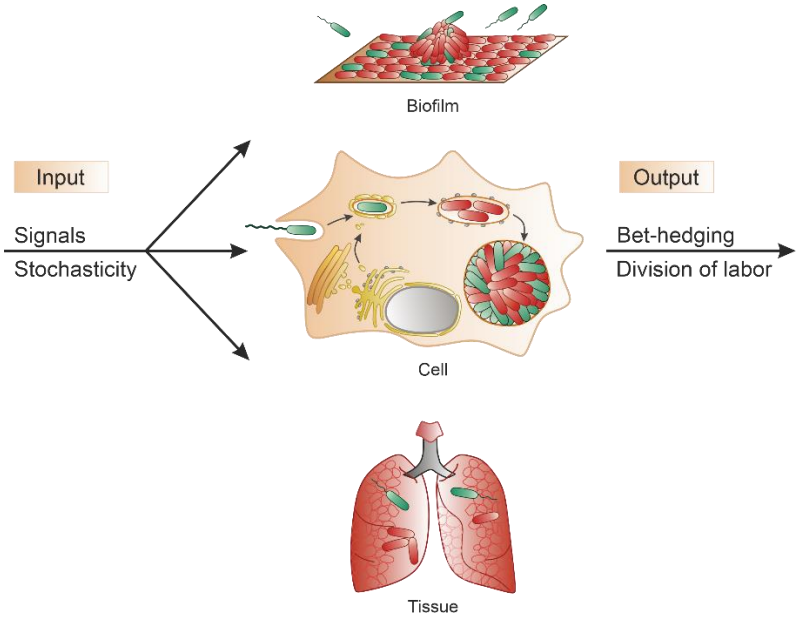

Fig. 1. Cues and consequences of phenotypic heterogeneity. Clonal bacterial populations, growing as planktonic cells, in biofilms, or within host cells or tissue adopt phenotypic heterogeneity, i.e., reversible cell-to-cell variations of traits (green/red bacteria). The phenomenon occurs either in response to (extrinsic or intrinsic) signals or due to stochastic gene expression. The functional consequences of phenotypic heterogeneity are conceptualized as bet-hedging or division of labor strategies, allowing an optimal adaptation to consecutive, rapid, and frequent fluctuations in environmental conditions or the concomitant, interactive expression of distinct, often complementary traits, respectively.

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