

Abstract

Persistent bacteria, shortly persisters, are cells that are characterized by their tolerance to antibiotics without containing resistance genes. These are not resistant bacteria, because resistant bacteria are determined by genetic code. Persisters are indistinguishable from other antibiotic sensitive bacteria, and they are rather transient phenotypic subpopulations. Probably all types of bacteria can create a persistent stage, the ability is not species-bound and persistence has been described in a number of bacterial species. The reason for the formation of persistence may be sudden stress, then it is induced formation, or the reason may be an insurance for the future, then we call it stochastic phenotypic variability. Then a variety of phenotypes of different subpopulations within a genetically uniform population can be distinguished. They differ in growth properties and tolerance to antibiotics. Bet-hedging strategy is a hypothesis that describes persistence as insurance against the risk of external fluctuations. During stress an alarmon guanosine tetraphosphate or guanosine pentaphosphate is accumulated to alert the cell to unfavorable conditions and it initiates transition to a more tolerant state. The existence of these tolerant subpopulations is important in recurrent diseases because small subpopulations of persisters can give rise to a new stable population, complicate treatment and prevent healing, often through biofilm formation.

Keywords: Persistence, Antibiotics, (p)ppGpp, Bet-hedging, Biofilm