Hiroshi Ogawara: Comparison of Strategies to Overcome Drug Resistance: Learning from Various Kingdoms. REVIEW ARTICLE

Abstract: Drug resistance, especially antibiotic resistance, is a growing threat to human health. To overcome this problem, it is significant to know precisely the mechanisms of drug resistance and/or self-resistance in various kingdoms, from bacteria through plants to animals, once more. This review compares the molecular mechanisms of the resistance against phycotoxins, toxins from marine and terrestrial animals, plants and fungi, and antibiotics. The results reveal that each kingdom possesses the characteristic features. The main mechanisms in each kingdom are transporters/efflux pumps in phycotoxins, mutation and modification of targets and sequestration in marine and terrestrial animal toxins, ABC transporters and sequestration in plant toxins, transporters in fungal toxins, and various or mixed mechanisms in antibiotics. Antibiotic producers in particular make tremendous efforts for avoiding suicide, and are more flexible and adaptable to the changes of environments. With these features in mind, potential alternative strategies to overcome these resistance problems are discussed. This paper will provide clues for solving the issues of drug resistance.

Keywords: drug resistance; self-resistance; phycotoxin; marine animal; terrestrial animal; plant; fungus; bacterium; antibiotic resistance

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