

The 'checkmate' for iron between human host and invading bacteria: chess game analogy

ABSTRACT

Iron is an essential nutrient for all living organisms with critical roles in many biological processes. The mammalian host maintains the iron requirements by dietary intake, while the invading pathogenic bacteria compete with the host to obtain those absorbed irons. In order to limit the iron uptake by the bacteria, the human host employs numerous iron binding proteins and withholding defense mechanisms that capture iron from the microbial invaders. To counteract, the bacteria cope with the iron limitation imposed by the host by expressing various iron acquisition systems, allowing them to achieve effective iron homeostasis. The armamentarium used by the human host and invading bacteria, leads to the dilemma of who wins the ultimate war for iron.

Keyword: Iron; Host–pathogen; Iron homeostasis; Host defense; Siderophore; Microbial iron acquisition