Colonization And Virulence Potential Of A New Breed of Klebsiella pneumoniae

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Abstract

Classical Klebsiella pneumoniae is typically a hospital acquired infection affecting immunocompromised patients. However, the rise of multi-drug resistance, including carbapenem-resistance in K. pneumoniae, is a significant health problem world-wide. In the last three decades, hypervirulent K. pneumoniae has become the major cause of community-acquired pyogenic liver abscess in parts of Asia such as South Korea, Singapore, Taiwan and Hong Kong. Hypervirulent isolates are generally hypermucoviscous with the possession of a large virulent plasmid encoding mmpA and iron siderophores, and they are capable of infecting healthy individuals. K1 and K2 capsular types are the predominant hypervirulent isolates. We found that in Singapore, the dominant isolates causing the disease are different in the various ethnic groups. In Klebsiella induced liver abscess (KLA), colonization by the bacteria is believed to precede translocation from the intestines to the liver. However, factors which predispose and facilitate the colonisation and translocation in the gut are not defined. In our oral infection mouse model with a K1 hypervirulent isolate, we examine various bacterial factors that could contribute to the establishment of an intestinal niche. We also examine the immune response that is necessary to tackle the infection in the liver. Although hypervirulent isolates are usually antibiotic-sensitive, we have discovered local isolates which are both hypervirulent and carbapenem-resistant, making these superbugs almost untreatable. I shall discuss the implication of these findings.