Planktonics or Biofilms infections?

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There are a large number of diverse interactions between bacteria and their hosts. They range from a symbiotic relationship -beneficial for both parts- to an infection rapidly leading to the host's death. Amidst these extremes lie the chronic infections. Disease is the manifestation of a combination of bacterial virulence factors and the host's immune response. A number of bacterial species that produce chronic infectious diseases, such as *P. aeruginosa*, *S. aureus*, *S. epidermidis* or *E.coli*, are also capable of generating invasive acute infections. A clear example is *P. aeruginosa*, whose bacteraemia leads to death within hours if no treatment is provided. Such bacterium is able to persist for decades at high numbers [108 to 1010 colony forming units (CFU)/mL] in the airways of patients suffering from cystic fibrosis, never causing an invasive infection, or they can spread beyond the lungs.

As in other chronic infections, bacteria adapt to their environment. Growing evidence indicates biofilms play a major role in these adaptations. Bacteria exist in a biofilm state increase the bacterial resistance to antibiotics (because some characteristics of the structure and metabolic different state of the bacteria forming the biofilm are present) while shielding them from the immune system by masking antigens.

In the biofilm state, bacteria adhere to a surface and encase themselves in a secreted matrix, tending not express invasion and motility machinery [1-5]. The determination of bacterial biofilms as a recognized and perhaps preferred form of bacterial existence and the evidence for its implication in chronic infections throughout the body is now insurmountable.

The general theory about biofilms prevalence was not established until 1978. Such theory states that most of bacteria grow enclosed within a matrix thus constituting a biofilm that adheres to most surfaces, and they are deeply divergent from their counterpart, the free floating or planktonic bacteria [1,2,4,6]. This theory is based on data obtained from natural aquatic ecosystems, where direct observations with a microscope show unequivocally that over 99% of bacteria grow constituting biofilms [7].

The fact that bacteria most grow organizing biofilms both in natural and man-made systems has not been immediately accepted in the medical and dental fields, even though the dental plaque is a biofilm universally accepted. The dental plaques "animalcules" described by Antoine van Leeuwenhoek represent the first evidence of a biofilm in History. With the advances and the advent of new methods of study, the initial skepticism has been gradually set aside [8]. Biofilms have now been implicated in many infectious processes, including dental caries, periodontitis, otitis media, musculoskeletal infections, necrotizing fasciitis, biliary tract infection, osteomyelitis, bacterial prostatitis, native valve endocarditis, chronic rhinosinusitis and cystic fibrosis pneumonia.

Furthermore, there is a long list of nosocomial-type infections in which biofilms are involved. These include intensive care unit pneumonia, sutures, arterio-venous shunts, scleral buckles, contact lenses, urinary catheter cystitis, endotracheal tubes, Hickman catheters, central venous catheters, and pressure equalization tubes [9-10]. In this reflection I hope to encourage to view the bacteria as a complex community called biofilm, an organism itself that can have a principal role in the development of human infectious diseases.

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