Biofilm formation capacity of S. aureus under diabetic environments

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Diabetes increases the blood glucose levels above those of healthy individuals and poorly controlled diabetes is associated to ketoacidosis. Different authors have shown evidences that diabetes is linked to a higher risk of developing infections in different parts of the body. Although the reasons why diabetes enhances infection episodes are not entirely clear, different undesired physiological responses under diabetic environments are pointed out as the main causes, for example, inflammatory reactions, poor vascularization, neutrophilic chemotaxis or phagocytosis. However, it has so far not been quantified how high concentrations of glucose and ketone bodies can affect the beginning of the infectious process, i.e. the formation of biofilms.

In this sense, this research will address how the presence of glucose and ketone bodies can alter the biofilm formation capacity of Staphylococcus aureus. The research will be carried out with six different diabetic conditions, including the individual action of both components (glucose and ketone bodies) and the combined action.

The main conclusion of this work is that any studied diabetic condition is able to increase the slime index of S. aureus with respect to control (bacteria grown without diabetic supplements), so the biofilm formation capacity of this bacterium would rise in diabetic people. In addition to the change that can be as high as 400% in glucose concentrations of 1.9 mg/ml, the clustering behavior among the bacteria is also modified at all condition differently.