

Fibronectin and laminin induce biofilm formation by *Streptococcus uberis* and decrease its penicillin susceptibility

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ABSTRACT

The aim of this study was determined the effect of fibronectin and laminin on the *in vitro* biofilm formation by *Streptococcus uberis* and the susceptibility to penicillin under planktonic and biofilm growth conditions. We observed that a high percentage (76.5%) of the *S. uberis* isolates was weak biofilm producers in Todd Hewitt Broth (THB). A high percentage of moderate (38.2%) or strong (53%) biofilm producers was observed in THB supplemented with laminin or fibronectin, respectively. All *S. uberis* isolates growing as planktonic cells were sensitive to penicillin. Minimum biofilm inhibitory concentrations (MBICs) were ranging between 0.25 to 2 µg/ml, whereas minimum biofilm eradication concentrations (MBECs) ranging from 8 to 256 µg/ml. These results show that biofilm-growing *S. uberis* cells required higher concentrations of the antibiotic than those needed to inhibit planktonic cells. Similar MBICs of penicillin were obtained when *S. uberis* cells growing in THB supplemented or not with laminin or fibronectin, whereas the MBECs markedly increased when one of two proteins were added to culture medium compared with the medium without proteins. To the best of our knowledge, this is the first report of decreased susceptibility to penicillin likely related to a higher production of biofilms stimulated by laminin or fibronectin. Therapeutic failures of penicillin to treat *S. uberis* infections may be due to biofilm formation.

Keywords: LAMININ, FIBRONECTIN, PENICILLIN, BIOFILM, *Streptococcus uberis*