DOES ESTRADIOL HAVE AN IMPACT ON THE DIPEPTIDYL PEPTIDASE IV ENZYME ACTIVITY OF THE PREVOTELLA INTERMEDIA GROUP BACTERIA?

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BACKGROUND & AIMS

Initiation and development of pregnancy-associated gingivitis is seemingly related to the microbial shift towards specific gram-negative anaerobes in subgingival biofilms. *Prevotella intermedia* (sensu lato) is able to use estradiol as an alternative source of growth instead of vitamin K. The aim was to investigate in *vitro* the impact of estradiol on the bacterial dipeptidyl peptidase IV (DPPIV) enzyme activity of the *P. intermedia* group bacteria (*P. intermedia*, *P. nigrescens*, *P. pallens*, and *P. aurantiaca*) grown in biofilms.

MATERIALS & METHODS

- In all experiments, 2 strains of each species were incubated with the concentrations of 0 (control), and 30, 90, and 120 nmol/L of estradiol, representing equivalent serum estradiol concentrations simulating the first, second, and third trimester of pregnancy, and allowed to build biofilms at an air-solid interface.
- DPPIV activities were measured kinetically during 20 min using a fluorometric assay. The enzyme activity was related to the amount of protein produced by the same biofilm, reflecting the biofilm mass.
- The experiments were performed in triplicates.

RESULTS

- **Total protein mass/Biofilm**
- **Total enzyme activity**
- **Enzyme activity/Protein mass**

**Figure 1.** Data are presented in micrograms. Gray asterisks indicate significant differences with the control while black asterisks indicate significance levels for the comparison between groups (*P*<0.05, **P**<0.01, and ***P***<0.001).

**Figure 2.** Data are presented as fluorescence excitation and emission intensity values. Gray asterisks indicate significant differences with the control while black asterisks indicate significance levels for the comparison between groups (*P*<0.05, **P**<0.01, and ***P***<0.001).

**Figure 3.** Data are presented as ratios of fluorescence excitation and emission intensity values to the total protein mass. Gray asterisks indicate significant differences with the control while black asterisks indicate significance levels for the comparison between groups (*P*<0.05, **P**<0.01, and ***P***<0.001).

CONCLUSIONS

Elevated estradiol concentrations enhance the relative and quantitative DPPIV proteolytic enzyme activity in strain- and dose-dependent manners. These significant findings may, at least partly, explain the differences seen in the participation of the 4 *P. intermedia* group organisms in pregnancy-associated gingivitis and, further, the role that estradiol plays to elicit a virulent state which could contribute to the pathogenesis of this common condition in pregnant women. The role of *P. aurantiaca* in its pathogenesis is novel and deserves further evaluation.

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