исходит не только в клетках карцином, но и в дермальных фибробластах кожи. Однако экспрессия этих рецепторов именно в клетках карцином может играть ключевую роль в их распространении по организму.

ЗАКЛЮЧЕНИЕ

В результате контакта внешнего мембранного белка бактерий OmpX с поверхностью клеток человека происходит увеличение экспрессии рецептора ЭФР, Е-кадгерина, субъединиц α5- и β1-интегринов, которые вовлечены в инвазию бактерий *S. proteamaculans*. Степень увеличения экспрессии рецепторов зависит от свойств клеточной линии и стадии роста бактерий. Динамика увеличения интенсивности экспрессии протестированных рецепторов в зависимости от стадии роста бактериальной культуры сходна только для генов рецептора ЭФР и β1-интегрина. И именно она определяет интенсивность инвазии бактерий в клетки. Кроме того, в клетках A549 увеличение экспрессии генов рецептора ЭФР и β1-интегрина может быть необходимо для восполнения пула рецепторов, которые перемещаются от мембраны в цитоплазму клетки хозяина при заражении.

ФИНАНСИРОВАНИЕ РАБОТЫ

Работа выполнена при поддержке Российского научного фонда (проект № 24-25-20045) и Санкт-Петербургского научного фонда (проект № 24-25-20045).

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OPPORTUNISTIC BACTERIA SERRATIA PROTEAMACULANS REGULATE THE INTENSITY OF THEIR INVASION BY INCREASING THE EXPRESSION OF HOST CELL SURFACE RECEPTORS

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The *Serratia proteamaculans* are able to penetrate eukaryotic cells. One of the virulence factors of these bacteria is the bacterial surface protein OmpX. The OmpX protein increases the adhesion of bacteria to the surface of eukaryotic cells. In addition, this protein increases the gene expression of the EGF receptor and β1 integrin, which determine the intensity of *S. proteamaculans* invasion. We show that OmpX also increases the expression of E-cadherin, which is involved in *S. proteamaculans* invasion. The objective of this work was to compare the effect of bacteria at different growth stages on the gene expression of receptors in carcinoma cells, which normally synthesize different numbers of receptors involved in invasion. Bacteria were used after 24 hours of growth, when they had not yet synthesized the OmpX-cleaving protease protealysin, and after 48 hours of growth, when active protealysin was detected in bacterial extracts. After 24 and 48 hours of growth, the bacteria induce an increase in the gene expression of EGF receptor, E-cadherin, β1 and α5 integrins in M-HeLa cervical carcinoma cells, A549 lung carcinoma cells, Caco-2 colon adenocarcinoma cells, and DF-2 skin fibroblasts. The intensity of the increase in receptor expression depends on the properties of the cell line and the growth stage of the bacteria. Moreover, infection with *S. proteamaculans* causes a similar increase in the expression of only the EGF receptor and β1 integrin. Using quantitative invasion, it was shown that the intensity of bacterial invasion, depending on the growth stage of the bacterial culture, correlates with the dynamics of increased gene expression of the EGF receptor and β1 integrin. When analyzing the number of receptors, it was shown that an increase in the gene expression of the EGF receptor and β1 integrin in cells may be necessary to replenish the pool of receptors that move from the membrane into the cytoplasm of the host cell during infection. Thus, as a result of contact of the bacterial surface protein OmpX with the surface of a human cell, receptors involved in *S. proteamaculans* invasion accumulate. Moreover, it is the increase in the gene expression of the EGF receptor and β1-integrin that determines the sensitivity of infected cells to *S. proteamaculans*.

Keywords: bacterial invasion, protealysin, outer membrane protein OmpX, *Serratia proteamaculans*, EGFR, α5β1 integrin, E-cadherin