

ŻYJĄCE LECZ NIE DAJĄCE SIĘ HODOWAĆ BAKTERIE

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1. Wstęp. 2. Zjawisko niehodowalności wśród patogenów bakteryjnych. 3. Nie dające się hodować bakterie glebowe. 3.1. Przesączalność, budowa komórki a hodowalność bakterii glebowych. 3.2. Przesączalność a metaboliczna aktywność. 4. Reakcja bakterii na głodzenie. 5. Molekularne interpretacje niehodowalności bakterii. 6. Czynniki wpływające na wyniki testów na hodowalność bakterii. 7. Podsumowanie

Viable but nonculturable bacteria

Abstract: The stage VBNC (Viable But Nonculturable) is a strategy assumed by microorganisms when they are exposed to stresses of the environment. In this stage bacteria are still viable, show the metabolic activity and respiration but can not be shown as colony forming units by the conventional plate methods. The stage VBNC is usually detected both in Gram-negative and Gram-positive soil and water bacteria as well as in pathogenic bacteria with a considerable clinical importance. Therefore it is important to know whether or not the cells in the stage of nonculturability can be still pathogenic.

Up to the date it is not known whether the VBNC is a stable physiological stage or only a temporary form, leading to death. Some bacteria capable to grow on the routine laboratory media, after the stress, for instance starvation, stop to grow *in vitro* but still show features of living cells, *i.e.* metabolic activity and maintaining structures.

Factors affecting the nonculturability of bacteria can be lethal or sublethal injury of the cells, adaptation and differentiation, nutrient substrates accelerating the death, lysogenic bacteriophages. Classical methods for determining viability status of bacteria are time consuming. Molecular methods offer speed, sensitivity and specificity. Both DNA and RNA have been analysed using molecular amplification methods such as polymerase chain reaction (PCR), reverse transcriptase PCR (RT-PCR) and nucleic acid sequence-based amplification (NASBA). However due to the variable persistence of nucleic acid in post-death cells, the relationship between presence of DNA and RNA and viability is not clear-cut.

1. Introduction. 2. Occurrence of nonculturability among pathogenic bacteria. 3. Nonculturable soil bacteria. 3.1. Filterability, cell constituents and culturability. 3.2. Filterability and metabolic activity. 4. The starvation response of bacteria. 5. Molecular interpretation of nonculturability of bacteria. 6. Factors influencing the results of tests on the culturability of the bacteria. 7. Conclusions

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