

## Can bacteria *F. nucleatum* be actively involved in colon cancer progression via a radical mediated mechanism?

### Autorzy

Kamila Stokowa-Sołtys

Karolina Kierpiec

Klaudia Szczerba

Robert Wieczorek

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### Streszczenie

Outer membrane proteins of *Fusobacterium nucleatum*, a cancer-leading bacteria, are considered as the factors responsible for its pathogenicity. Among them, homotrimeric autotransporter protein YadA (*Yersinia* adhesin A) is an important virulence factor also found in the outer membrane of pathogenic *Yersinia* species. In this paper, the structure and stability of certain Cu(II) complexes with YadA fragments were investigated using both, experimental and theoretical methods. Potentiometry, UV–Vis, CD, EPR, and calculations at the density functional theory (DFT) level were applied to determine the metal ion coordination sphere. Moreover, the complexes ability to DNA cleavage and reactive oxygen species (ROS) production was studied. We have shown that copper(II) complexes can cleave DNA by  $^1\text{O}_2$ ,  $\text{O}_2^{\bullet-}$  and  $\bullet\text{OH}$ , which are formed in the studied systems. However, the results of electrophoretic experiments revealed that complexes cleave DNA less effectively than free copper(II) ions. Therefore, the presence of studied peptides may prevent DNA from a Cu(II)-induced damage to some extent.

### Słowa kluczowe

*Fusobacterium nucleatum*, YadA, Copper(II) complexes with peptides, Negatively charged complexes, Radical-induced DNA cleavage, Reactive oxygen species

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