Aspergillus fumigatus ZrfC Zn(II) transporter scavengers zincophore-bound Zn(II)

Autorzy

Kinga Garstka

Gabriela Potoczniak

Henryk Kozłowski

Magdalena Rowińska-Żyrek

Rok wydania

2024

Czasopismo

Dalton Transactions

Numer woluminu

53

Strony

2848-2858

DOI

10.1039/d3dt04083f

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Aspergillus fumigatus is an opportunistic pathogen that is able to invade and grow in the lungs of immunosuppressed patients and cause invasive pulmonary aspergillosis. The concentration of free Zn(II) in living tissues is much lower than that required for optimal fungal growth; thus, to obtain Zn(II) from the host, *Aspergillus fumigatus* uses highly specified Zn(II) transporters: ZrfA, ZrfB and ZrfC. The ZrfC transporter plays the main role in Zn(II) acquisition from the host in neutral and mildly alkaline environment *via* interacting with the secreted Aspf2 zincophore. Understanding the Aspf2–ZrfC interactions is therefore necessary for explaining the process of Zn(II) acquisition by *Aspergillus fumigatus*, and identifying Zn(II) binding sites in its transporter and describing the thermodynamics of such binding are the fundamental steps to achieve this goal. We focus on two probable ZrfC Zn(II) binding sites and show that the Ac-MNCHFHAGVEHCIGAGESESGSSQ-NH_2 region binds Zn(II) with higher affinity than the Ac-TGCHSHGS-NH_2 one and that this binding is much stronger than the binding of Zn(II) to the Aspf2 zincophore, allowing efficient Zn(II) transport from the Aspf2 zincophore to the ZrfC transporter. The same ZrfC fragments also able to bind Ni(II), another metal ion essential for fungi that could also compete with Zn(II) binding, with comparable affinity.

Adres publiczny

http://dx.doi.org/10.1039/D3DT04083F

Strona internetowa wydawcy

https://www.rsc.org/