

Publication

Non-specific interference of cobalt with siderophore-dependent iron uptake pathways

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4527121**Author(s)** Carballido Lopez, Ana; Cunrath, Olivier; Forster, Anne; Pérard, Julien; Graulier, Gwenaëlle; Legendre, Rachel; Varet, Hugo; Sismeiro, Odile; Perraud, Quentin; Pesset, Bénédicte; Saint Auguste, Pamela; Bumann, Dirk; Mislin, Gaëtan L. A.; Coppee, Jean Yves; Michaud-Soret, Isabelle; Fechter, Pierre; Schalk, Isabelle J.**Author(s) at UniBasel** [Bumann, Dirk](#) ;**Year** 2019**Title** Non-specific interference of cobalt with siderophore-dependent iron uptake pathways**Journal** Metallomics : integrated biometal science**Volume** 11**Number** 11**Pages / Article-Number** 1937-1951

Much data shows that biological metals other than Fe; 3+; can interfere with Fe; 3+; acquisition by siderophores in bacteria. Siderophores are small Fe; 3+; chelators produced by the microorganisms to obtain access to Fe; 3+; . Here, we show that Co; 2+; is imported into *Pseudomonas aeruginosa* cells in a complex with the siderophore pyochelin (PCH) by the ferri-PCH outer membrane transporter FptA. Moreover, the presence of Co; 2+; in the bacterial environment strongly affects the production of PCH. Proteomic and transcriptomic approaches showed that a decrease of PCH production is associated with repression of the expression of the genes involved in PCH biosynthesis. We used various molecular biology approaches to show that this repression is not Fur-(ferric uptake transcriptional regulator) dependent but due to competition of PCH-Co with PCH-Fe for PchR (transcriptional activator), thus inhibiting the formation of PchR-PCH-Fe and consequently the expression of the PCH genes. We observed a similar mechanism of repression of PCH production, but to a lesser extent, by Ni; 2+; , but not for Zn; 2+; , Cu; 2+; , or Mn; 2+; . Here, we show, for the first time at a molecular level, how the presence of a contaminant metal can interfere with Fe; 3+; acquisition by the siderophores PCH and PVD.

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