

The nitrate-nitrite-nitric oxide (NO) pathway in physiology and therapeutics.

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The nitrate-nitrite-nitric oxide (NO) pathway is a critical process that plays a significant role in physiology and therapeutics. This pathway involves the conversion of dietary nitrate to nitrite and subsequently to NO and other bioactive nitrogen oxides with signaling properties.

The conversion of nitrate to nitrite occurs in the oral cavity and gastrointestinal tract via bacterial reduction, and nitrite is then converted to NO through various enzymatic and non-enzymatic pathways. NO plays a crucial role in regulating vascular tone, platelet function, immune response, and mitochondrial respiration, among other functions.

Recent studies have highlighted the potential therapeutic applications of this pathway, including the treatment of hypertension, cardiovascular disease, and metabolic disorders. The use of nitrate and nitrite as dietary supplements has shown promise in improving exercise tolerance, reducing blood pressure, and enhancing mitochondrial function.

In my talk I will focus on recent findings in our laboratory showing that dietary nitrate can affect NO signaling and export of NO-bioactivity from the red blood cell. I will also briefly discuss the generation of di-nitrosyl iron complexes (DNICs) from dietary nitrate and the involvement of host bacteria in this process.