The oral N-metabolism and its correlation with periodontal disease and hypertension – a cross-sectional study

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Nitric oxide (NO) is a signaling molecule that plays key roles in various physiological processes such as neurotransmission, homeostasis, cytoprotection, platelet aggregation inhibition, host defense, and the regulation of the systemic vasodilator tone and blood pressure.

Scientific evidence has shown that the salivary levels of nitrate and nitrite may correlate with the presence of periodontitis and its clinical markers, such as pocket depth and clinical attachment loss. Recent advances have shown that nitrate-to-nitrite reduction by oral bacteria could play a key role in this process. Additionally, epidemiologic studies have demonstrated that the systemic health can be influenced by poor oral health and disturbed microbiota linking the oral bacteria to blood pressure.

This study aims to conduct a medium-sized observational clinical study on the role of the nitratenitrite-NO pathway in cardiovascular and periodontal disease. To this end, will correlate the nitrite levels in saliva with the periodontitis development stage, either in participants with no cardiovascular conditions or presenting hypertension symptoms. Furthermore, we will study the effect of oral microflora on the nitrate/nitrite levels in saliva (and vice versa). To assess the concentration of these N-oxides in physiological samples at the point of care, we will use new easy-to-use biosensors that are under development in our group. Participants will be recruited at the Egas Moniz Dental Clinic. The population targeted for this study should have periodontal disease. The risk of CVD will be assessed through the patient's medical history, blood pressure measurement and answers to a questionnaire that will also ask the patients about their dietary habits. Freshly collected plasma and saliva samples will be analyzed directly for the measurement of nitrates and nitrites. Most of the evidence in this field comes from in-vitro studies and it is mandatory to conduct well design in-vivo studies, taking into consideration the diet and the oral microbiome.

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