

## Importance of Oral Microbiome in Nitric Oxide Production

**A healthy mouth can harbor upwards of 10 billion bacteria. Without a healthy balance of bacteria in our mouths, our bodies are not able to produce enough Nitric Oxide (NO).**

Antiseptic mouthwashes, mouth breathing and even essential oils not only disturb the number of the bacteria, they also alter the composition of the bacterial communities in the mouth. Despite this, 30-45% of adults in the US use antiseptic mouthwashes, spending upwards of \$1.5 billion annually and as a result affecting their ability to produce NO.

### Nitrate-Nitrite-NO Pathway

Nitrates in our diet are efficiently absorbed into the blood stream in the GI tract, entering the Nitrate-Nitrite-NO pathway. Circulating nitrate concentrates in the salivary glands, which then accumulates in the saliva. At least 25% of all circulating nitrate is actively taken up by the salivary glands by this enterosalivary circulation.

Commensal oral bacteria on the dorsal aspect of the tongue start the nitrate reduction which ultimately leads to NO production. It has been estimated that approximately 50% of our NO comes from this pathway. Failure to produce sufficient NO is causal for the onset and progression of a number of cardiovascular diseases including hypertension and atherosclerosis.

In one study looking at antiseptic mouthwash use and nitrite concentration, after 7 days of twice daily antiseptic mouthwash use, salivary nitrite concentration was reduced by 90%. This caused a corresponding rise in systolic and diastolic blood pressure. In another study, this effect appeared within 1 day of using the antiseptic mouthwash leading to an increase in blood pressure.

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### Other Factors

In addition to antiseptic mouthwashes affecting the oral microbiome, tongue scraping/cleaning, positively influences blood pressure. With daily tongue cleaning, there was an increase in a type of bacteria that is a major nitrate and nitrite reducing species of the oral cavity. Regular tongue cleaning both selects for a favorable microbiome and 'revs up' the activity of the community.

### Conclusion

The nitrate and nitrite-reducing flora of the tongue, significantly correlates with resting blood pressure values. This is seen with the negative effects of regular antiseptic mouthwash use or conversely the positive effects of tongue cleaning.

Continuously generating NO is essential for the integrity of the cardiovascular system, and decreased production or bioavailability of NO can be central to the development of serious cardiovascular issues.

# Life

## Berkeley Life Nitric Oxide Support Program is based on a simple premise:

Provide a plant-based equivalency of nitrate that would be found in clinically-supported beet juice and leafy greens, allowing the body to convert nitrate – at the appropriate time and at the appropriate place within the body – to NO.

## Berkeley Test Strip is a patented salivary nitric oxide test strip.

The strips answer the question for individuals:

1. Is my diet or supplementation effective at enhancing my NO status?
2. Is my body converting nitrate to NO as well as ensuring sustained levels throughout the day?

For any Patients concerned if their oral hygiene routine is affecting their body's ability to convert Nitrate to Nitrite, the Berkeley Test Strips offer a simple non-invasive testing method. If results are in the range of Threshold to High then the oral microbiome is intact and conversion is taking place.

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For more information e-mail:  
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### References:

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