

## Clinical Relevance for Tooth Health Measurements

- Research has provided significant information regarding the association between salivary bacteria and dental caries. A primary contributor of caries is acid production from dietary carbohydrates by bacteria in saliva and plaque.
- **Frequent carbohydrate consumption and low pH favor the growth of cariogenic bacteria because of their ability to digest sucrose and acid tolerance.** When cariogenic bacteria dominate the saliva and plaque, more acids are produced at even higher rates, further increasing the prevalence of these bacteria.<sup>i</sup>
- Another contributing factor is the consumption of sugar. After consumption of sugar, the pH in the plaque will fall rapidly. This is due to the production of acids (mostly, lactic acid) by metabolism by the bacteria.
- The bacteria in the plaque will be exposed to the varying low pH. Some sites within the mouth can tolerate fluctuations in low pH but not in those individuals who frequently eat sugary snacks. This causes a prolonged low pH which creates for an acidic environment and allows for acid tolerant bacterial species, such as, *S. mutans* and *Lactobacilli*.
- For cariogenic bacteria, SillHa measures the reduction of Resazurin by bacteria that metabolize sucrose, which has been correlated with the number of cariogenic bacteria (such as *S. mutans* and *Lactobacilli*) present in saliva.<sup>ii</sup> Many studies have demonstrated that increased levels of *S. mutans* and *Lactobacilli* in saliva are correlated with increased caries as summarized by Guo et. al.<sup>iii</sup>

- Dental caries, which is strongly correlated with the presence of cariogenic bacteria, is also greatly influenced by inherent salivary factors. The process is controlled by a natural protective mechanism in saliva called buffering capacity.
- Buffering capacity is the mouth's ability to neutralize the pH level of the saliva. There are 3 different buffering systems in the mouth, the most important is the bicarbonate system, which diffuses bicarbonate ions into the plaque and neutralizes acids. Low buffering capacity and acidic saliva causes the demineralization of the tooth enamel which can result in caries.<sup>iv</sup>
- **Numerous studies have shown that salivary acidity and buffer capacity are associated with dental caries as summarized by Guo et al.**<sup>iii</sup>

## References

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<sup>i</sup> van Houte J. Microbiological predictors of caries risk. *Adv Dent Res.* 1993; 7(2):87-96. [PubMed 8260016]

<sup>ii</sup> Maki Y, Yamamoto H, Matsukubo t, Takaesu Y, Shibuya M, Kinoshita Y, Saito H, Tanaka H, Asami K. Specific color reaction of Resazurn Disc with saliva as a rapid caries activity test. *J. Dent. Health.* 1983;33(2):169-182.

<sup>iii</sup> Guo L, Shi W. Salivary Biomarkers for Caries Risk Assessment. *J. Calif. Dent. Assoc.* 2013 February;41(2):107-118. [PubMed 23505756]

<sup>iv</sup> Shetty C, Hedge M, Devadiga D. Correlation between dental caries with salivary flow, pH and buffering capacity in adult south Indian population: An in vivo study. *Int. J. Res. Ayurveda Pharm.* 2013; 4(2): 219-223.