**The Detection of Systemic Disease Risk Based on Microbiome Analysis and LAMP Technology Using a Portable Device, the LifeSmile**

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Abstract: The LifeSmile oral microbiome diagnostic device is proposed to assess systemic disease risk from the comfort of your home. Roughly 700 resident microorganisms inhabit the oral cavity and are influenced by diet, immune health, and gender. Recent studies indicate these bacteria are safe at low levels, but they become a danger to human health at high levels. More specifically, the risk for seven serious human pathologies rises significantly as specific bacterial populations increase. These “microbiome detectable diseases” include preterm labor, cardiovascular disease, Alzheimer’s disease, and four cancers (oral, esophageal, pancreatic, and gastrointestinal) [1]. LifeSmile utilizes LAMP DNA amplification technology to produce a LED signal that informs the user of a healthy or at-risk oral microbiome. It is hypothesized that LifeSmile could process tooth swab samples to detect the major disease-causing bacteria of the oral microbiome. Twelve individuals provided tooth samples to evaluate differences in the seven categories of bacteria corresponding to the “microbiome detectable diseases.” Tooth DNA was extracted by scraping twelve individual’s teeth. Samples were then subject to next-generation Illumina MiSeq analysis to generate twelve individual oral microbiomes. A spreadsheet of these hundreds of bacteria and their abundances was subject to manual data mining [2,3]. The LifeSmile device evaluates the levels of these seven individual at-risk bacteria found by data mining the oral microbiomes. The microbiome experimental data analysis combined with information from reviews of this subject established a rationale for building the LifeSmile portable device. It houses a more direct DNA extraction and detection technology (LAMP). LifeSmile contains a small centrifuge and biofluidic distribution mechanism to distribute DNA to chambers containing primers for specific bacteria using LAMP analysis. Risk is displayed as a low/high LED signal in minutes. LifeSmile is technologically feasible because analogous Covid LAMP or CRISPR technology devices are already marketed for home use.

*References*

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