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From Amazon rain forest flora to the state-of-the-art technology devices, the incessant search for 'magic bullets' against *Streptococcus mutans*

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Came 1910, and that was Paul Ehrlich´s year. One day, that year, he walked into the scientific congress at Koenigsberg, and there was applause. It was frantic, it was long, you would think they were never going to let Paul Ehrlich say his say. He told of how the magic bullet had been found at last. (De Kruif[1] (1926) apud Sachs (2007)

Dear Readers,

After the keystone discovery of differences in the bacterial cells wall (i.e. the responsiveness to the crystal violet dye lead to the milestone gram-positive and gram-negative dichotomy), the Nobel Prize[6] laureate Paul Ehrlich (Nobel Prize in Physiology or Medicine 1908 "in recognition of their work on immunity") reasoned that we could find a toxic dye only absorbed by bacteria (and not by host cells), it could be the 'magic bullet' of his dreams[7].

After testing over nine hundred dyes and chemical compounds, the 606 compound (latter named Salvarsan) was found to be effective against the etiological agent of syphilis; but unfortunately such compound toxicity against the host was evidenced. While the '606' comprised a huge advance in the war on microbes, it became clear that search for the 'magic bullet' would be a long journey[7].

From Ehrlich´s initial insight, passing by the first true antibiotic development (which resulted in the The Nobel Prize[5] in Physiology or Medicine 1945 to Sir Alexander Fleming, Ernst B. Chain, Sir Howard Florey 'for the discovery of penicillin and its curative effect in various infectious diseases") to the modern days, researchers from numerous fields are still engaged in the search for a 'magic bullet'.

Considering the diversity and quantity of microbes present in the oral cavity even in healthy conditions, and the frequent pathogens that can trigger numerous oral conditions, Dentistry has been specially interested in 'magic bullets'. Tasks that sound quite simple, such as regular tooth brushing, can be quite effective in controlling *Streptococcus mutans* residing in the dental biofilm, and consequently, avoid its potential pathogenic effects in the development of dental caries. However, from the clinical viewpoint this 'simple task' was revealed to be quite more complex, where *S. mutans* virulence factors and host genetic susceptibility to *S. mutans* significantly add in complexity to this system[4,9]. Beyond caries framework, the recent reports of the possible involvement of *S. mutans* in endocarditis and atherosclerotic plaque development[3] reinforces the necessity of efficient strategies to allow its control. While antibiotics can be very effective against S. mutans, the current standards for a rationale use of antibiotics reinforces the necessity of development of alternative anti-Streptococcal compounds.

In this scenario, the current issue of the Journal of Applied Oral Science presents two examples of the everlasting search for an anti-Streptococcal 'magic bullet' with clinical application potential.

In a traditional end, Silva, et al.[8] (2014) screened over 2,000 rain forest (Brazilian Amazon) plant extracts regarding inhibitory activity against *Streptococcus mutans in vitro*. Indeed, the recognized knowledge of shamanic traditional medicine use of rain forest flora for treating native populations along the centuries has been a start point for several researchers in his search for new antimicrobial compounds. Indeed, Silva, et al.[8] (2014) conclude that compounds from *Casearia spruceana*, *Psychotria* sp. (*Rubiaceae*) and *Ipomoea alba* show potential as antibacterial agents for use as chemical coadjuvants in prevention strategies to treat caries. Finally, in the technological end, Hakimiha, et al.[2] (2014) investigated the effectiveness of different photosensitizers and light sources in *S. mutans* targeted-photodynamic therapy (PDT). The authors concluded that both 662 nm laser and LED light associated with photosensitizers Radachlorin and TBO were effective against *S. mutans in vitro*.

Therefore, two promising Anti-Streptococcal strategies are described, and the time and futures studies may let us know if the a definitive 'magic bullet' against *S. mutans* will came from the Amazon rain forest flora or from the state-of-the-art technology devices.

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