

Dental caries is the most common bacterial infectious disease in human and has become the basic cause of oral discommodo and tooth damage, seriously touching the quality of life of the patients. It is induced by specific class of acid-producing bacteria (e.g., *Streptococcus mutans*).

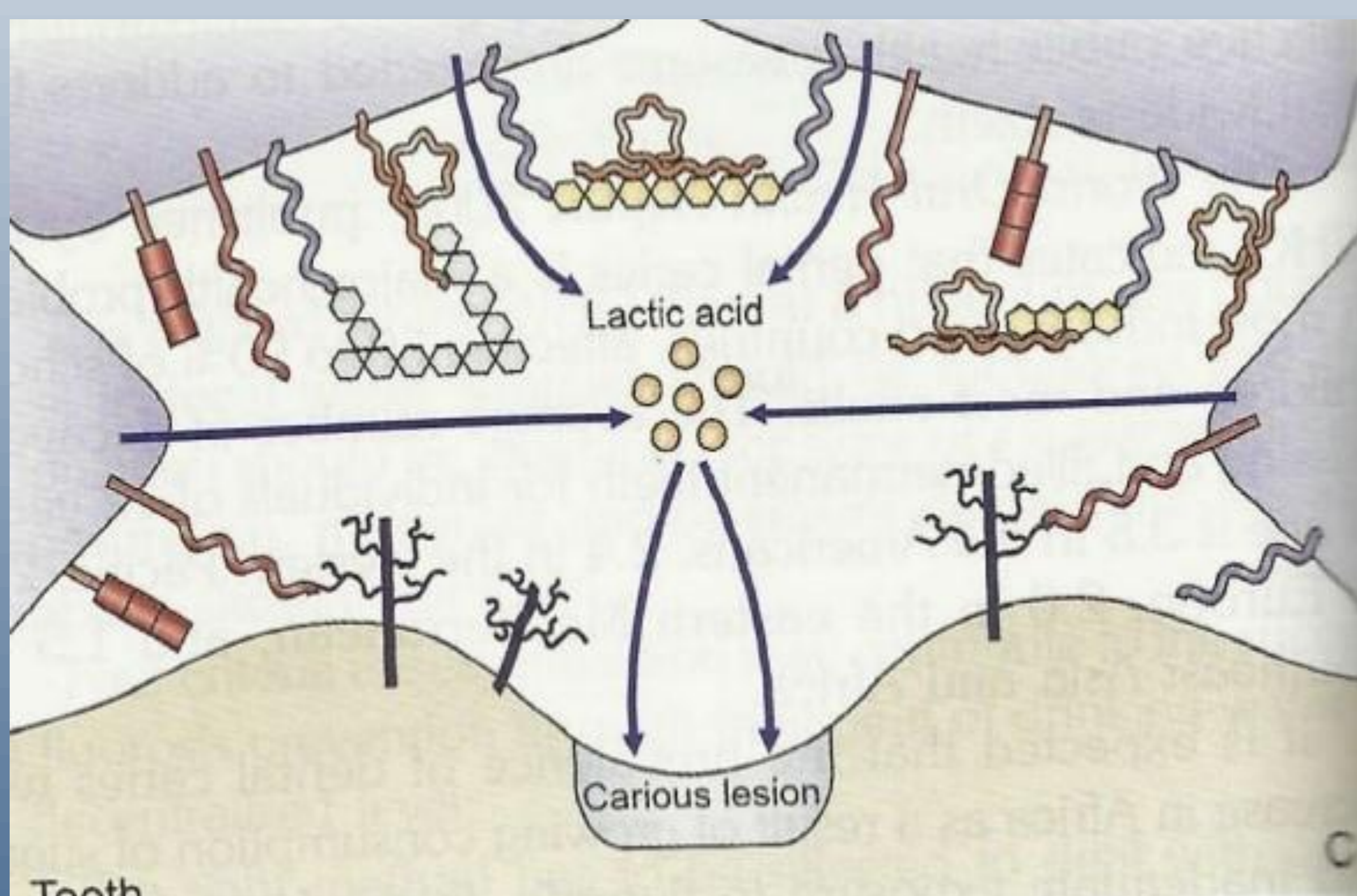
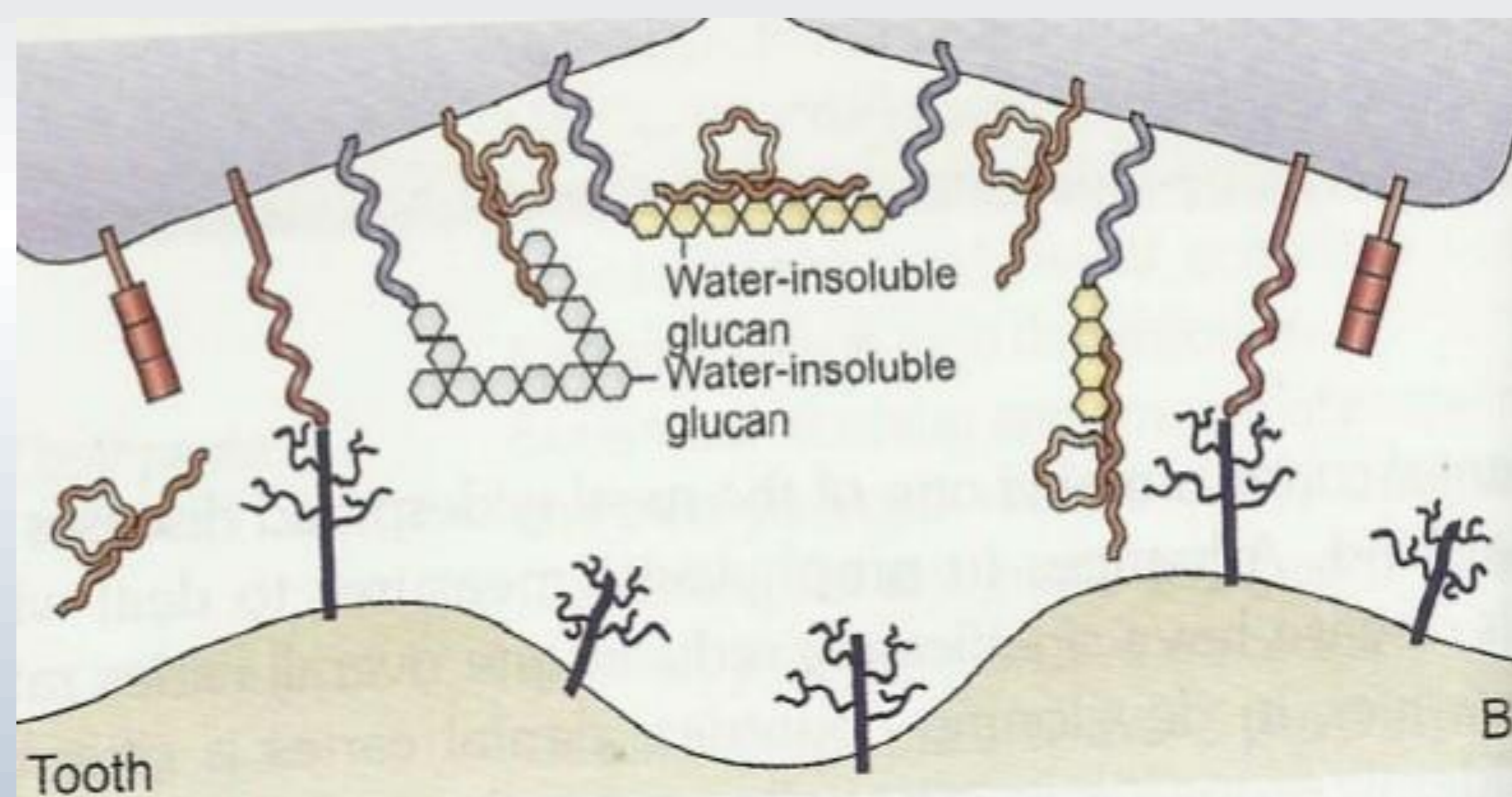
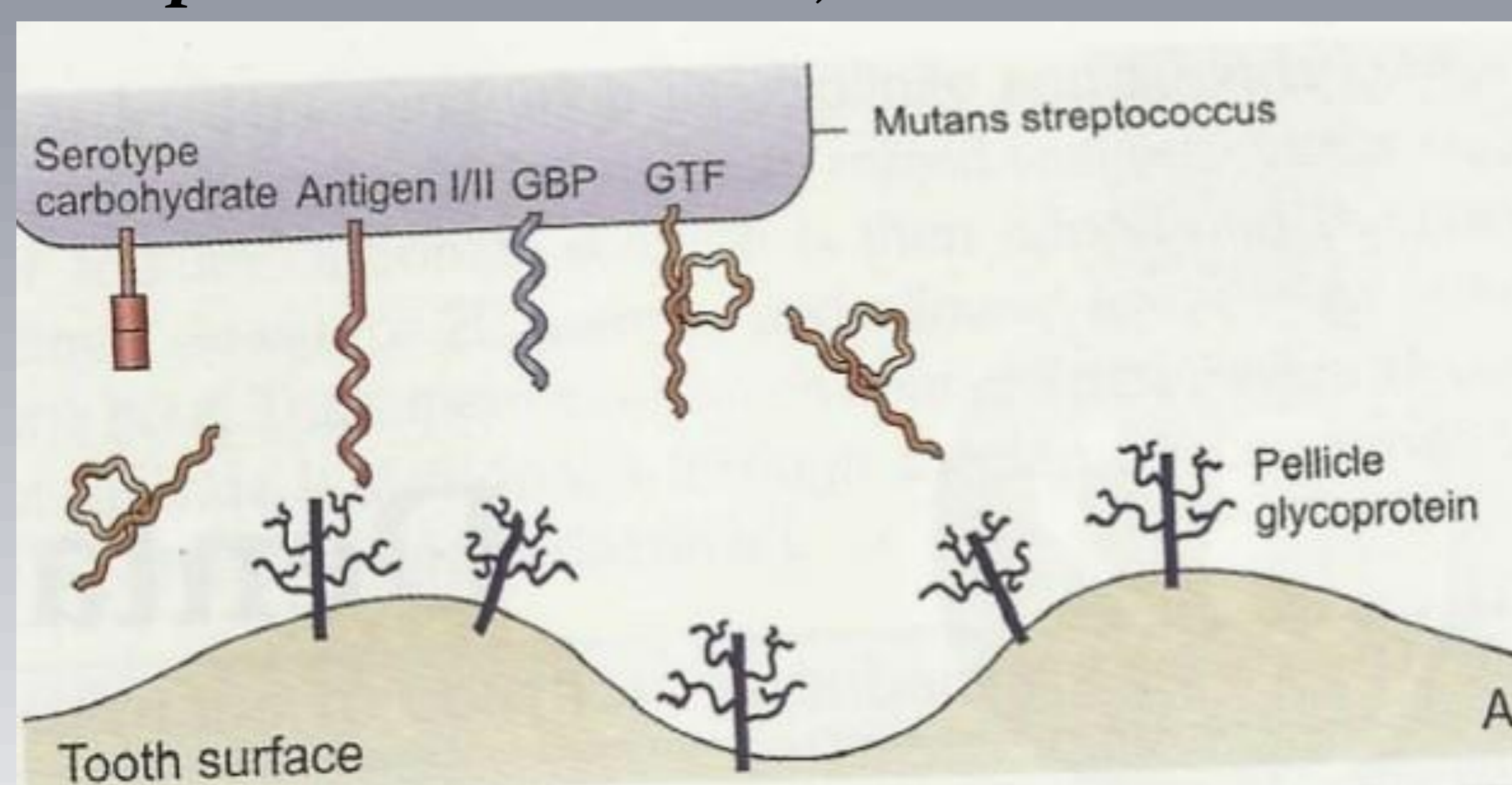


Fig. 1: Mechanisms of emergence and development of caries caused by *S. mutans* (A, B, C).

References:

- Gambhir RS, Singh S, Singh G, Singh R, Nanda T, et al. (2012) Vaccine against Dental Caries- An Urgent Need. *J Vaccines Vaccin* 3:136. doi:10.4172/2157-7560.1000136
- da Silva, D.R., da Silva, A.C.B., Filho, R.M., Verli, F.D. and Marinho, S.A. (2014) Vaccine against Dental Caries: An Update. *Advances in Microbiology*, 4, 925-933.
- Luo W, Wen Sh, Yang L, Zheng G (2017) Mucosal anti-caries DNA vaccine: a new approach to induce protective immunity against *Streptococcus mutans*. *Int J Clin Exp Pathol* 2017;10(2):853-857.

S. mutans has been strongly concerned as the prominent pathogen of dental caries in human. Anti-caries DNA vaccination is a new immunization procedure against dental infectious disease, and has many preferences over traditional vaccines, such as easy proceeding and contribution, and induction of long-lasting cellular and humoral immune responses. Anti-caries DNA vaccine may act as a multi-epitope vaccine and elevate strong immune response targeting *S. mutans*-associated antigens. Anti-caries DNA vaccine can induce S-IgA antibodies against *S. mutans*, decrease adherence and biofilms disposition, reducing the frequency of dental caries as a result. As a disadvantage, this vaccine has low immunogenicity because of its low capability for uptake.

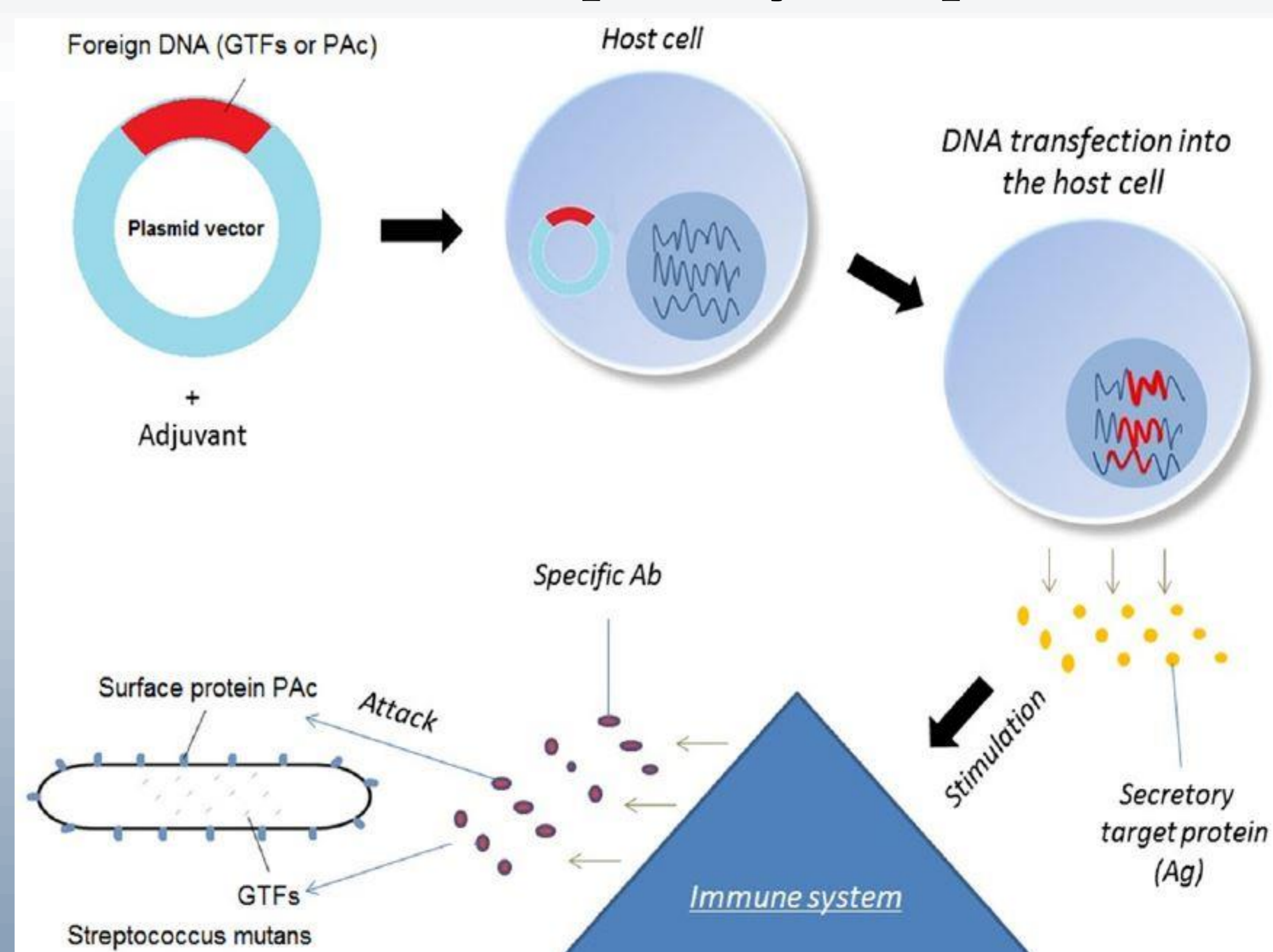


Fig. 2: Host cell transfection by plasmid vector with foreign DNA and the induction of protective immunity against GTFs and PAC, two major virulence factors of *S. mutans*.

As innovative approach, dental vaccines for prophylactic immunization can be the first non-living vaccines to be applied by mucosal route during the first three years of life. Further understanding and investigations of the signals that control the colonization and growth of *S. mutans* in dental biofilms may help to reduce spread and detrimental effects of cariogenic bacteria.