

Periodontal bacterial infection induced periodontal disease and cardiovascular disease

ABSTRACT

Cardiovascular diseases, including disorders such as atherosclerosis, are the leading cause of death in developed countries. During the past several years evidence has accumulated linking certain periodontopathogens and the development of atherosclerosis. Among this evidence is that genomic DNA of some oral bacteria species is frequently detected in excised atheromas. Recent publications have reported that genomic DNA of *Streptococcus mutans* is found in 74% of atheromas, which is more frequent even than genomic DNA of periodontopathogens. Most interestingly, the identified streptococcal DNA was frequently from serotypes other than the c serotype, the serotype that constitutes 70% of oral isolates and is associated with dental caries. In preliminary studies we identified isolates from serotypes e and f only that are able to invade primary cultures of human cardiovascular artery endothelial cells, a model system for the study of invasion of cardiovascular tissues. Our overall hypothesis is that invasion of the cells of the arterial walls by oral bacteria could represent the injury that either initiates or exacerbates the fibroproliferative response characteristic of atherosclerosis. We previously submitted an application for an R01 with the goal to investigate the molecular mechanisms involved in the interactions between invasive *S. mutans* strains and human coronary artery endothelial cells (HCAEC) as a model for *in vivo* interactions. However, the grant received no score, with the primary criticism being that there are no animal or human studies that show an association between the invasive strep and atherosclerotic plaques, consequently, it was considered high risk. Thus funding for a small study using a mouse atherosclerosis model is being requested in this application. The results from such a study, if showing an association, would then alleviate the concern of study section. It should also be noted that this is a new area of research for our lab since we have not previously worked with *S. mutans*.