Cardiovascular disease therapeutics via engineered oral microbiota: Applications and perspective

Background

- The application of engineered microbiota in cardiovascular diseases (CVDs)
- The roles and mechanisms of oral microbiota in CVDs
- The potential of engineered oral microbiota
Association between oral microbiota and CVDs

- Oral microbiota plays a crucial role in maintaining the stability of the oral microbial environment.
- Dysbiosis of oral microbiota can lead to the onset of systemic diseases.
- Periodontal pathogens such as *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans* can be detected in atherosclerotic plaques.
- Other oral pathogens are also associated with CVDs.
Figure 1. Application of engineering bacteria in CVDs related risk factors.
The application of oral engineering microbiota in CVDs

Figure 2. Schematic representation of the application of engineered bacteria in cardiovascular health.
Prospects

Advantages:

- Oral microbiota provides rich microhabitats.
- The oral cavity serves as the entry point to the digestive and respiratory systems.
- The collection methods of oral microbial samples are more convenient and diverse.
- Oral focal infections may originate from exposed areas, present a pathway for microbiota to invade deep tissues and contribute to systemic inflammation, thereby expanding the potential targets for colonization by engineered oral microbiota.
Prospects

Obstacles:
- Safety
- Ethical issues
- Transformation efficiency
- Clinical diversity of CVDs phenotypes
Summary

- Oral microbiota is closely related to the occurrence and development of CVDs.

- Engineered microbiota is seen as a potential way to treat CVDs and its associated risk factors.

- Oral probiotics and pathogenic bacteria can provide new avenues for the treatment of CVDs through gene editing and other engineered means.

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