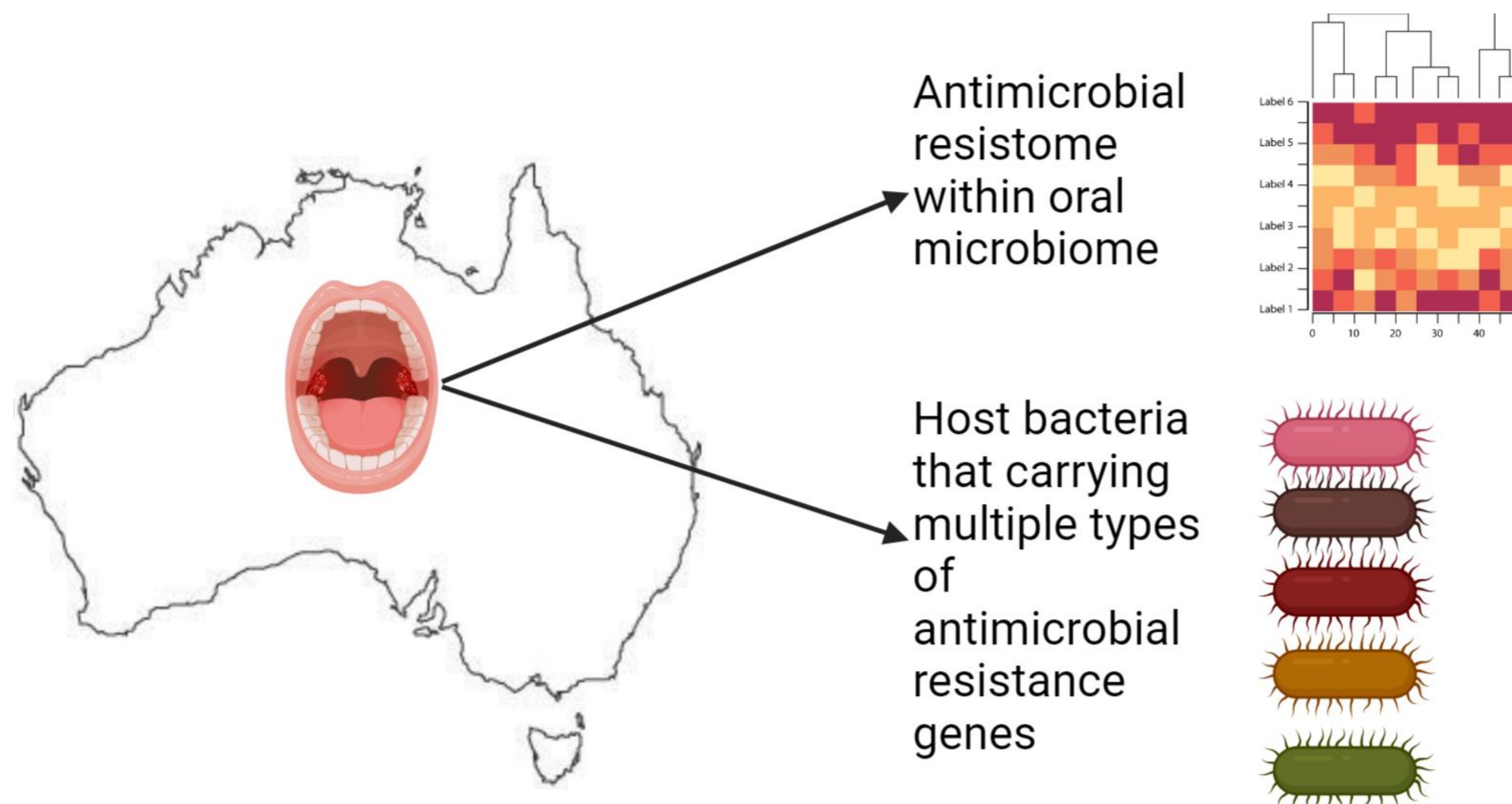


## Characterizing the drug resistant bacteria in Australian oral cavity

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### Project Summary:

Antimicrobial resistance has become a hidden pandemic that kills millions of people every year. The oral cavity is one of the most important microbiome niches in the human body, being the gateway to the gastrointestinal tract and its associated organs. Imbalance of the oral microbiome has been associated with various diseases such as periodontitis, endodontic infections and a multitude of extra-oral diseases. Antibiotics are prescribed for various reasons, and they may impact not only the gut resistome but also the oral resistome. The translocation of resistant oral bacteria into the circulation may predispose to sepsis, particularly in immunocompromised hosts. However, there is very little information about the oral resistome, an alarming gap in knowledge. At the UNSW Microbiome Research Centre, we have collected several Australian cohorts to investigate the oral and stool microbiome in health and disease. By applying advanced shotgun metagenomic sequencing technology on the oral microbiome, the characterization of the oral resistome becomes feasible. In this study, we seek to establish the first Australian oral resistome and to identify the factors that impact on them, as well as their host carrier. A ranking system of the most detrimental resistome carrying oral bacteria will be developed.

### MRC support:

**Cohorts:** MRC has established a big cohort of around 500 oral microbiome samples using shotgun metagenomic sequencing of oral microbiome. Shotgun metagenome can be used to profile the overall resistome of a sample, which is more comprehensive than traditional PCR based techniques. Moreover, public available 700 oral shotgun metagenomes were downloaded for comparison with other countries.

**Student role:** the student will use the bioinformatic tool for antimicrobial resistance analysis (ARGsOAP) published by Dr Xiaotao Jiang to characterize the oral resistome of Australian populations. Further statistical analyses on the demographic factors that govern the oral resistome will be elucidated.

### Capabilities developing for student:

- 1) Develop bioinformatics skill and microbiome knowledge
- 2) Understanding the antimicrobial resistance
- 3) Learn state of the art most advanced resistome research method

### Importance statement:

The oral cavity is the gatekeeper of the whole gastrointestinal tract and a healthy status, including the resistome, is pivotal to a healthy human microbiome. Understanding which oral bacteria carry the most detrimental resistance genes is critical for public health and infection control. This study will build the first Australian oral microbial resistome profile and ranking all the potential oral pathogens that needs caution for future management. This project is a small neat project that can produce publication after completion.

This research project is being conducted at St George & Sutherland Clinical school, Kogarah.

If you are interested in this project, you can email: Dr Xiaotao Jiang

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