Fluoride Resistance in Streptococcus Mutans.
Mw. Y. Liao
Fluoride has been used as the most effective anti-caries agent for over five decades. It functions not only on the dental hard tissues, but also as an antimicrobial agent. It is known that oral bacteria are able to develop resistance to fluoride, which may affect the effectiveness of fluoride in caries prevention. This thesis describes a number of experiments focusing on phenotypic and genotypic characteristics of fluoride-resistant strains of *Streptococcus mutans*, which is the most studied cariogenic bacterial species. By using the up-to-date whole-genome shotgun sequencing and molecular microbiology technique, Ying Liao discovered novel mechanisms of bacterial fluoride resistance. Genomic mutations and resulting altered regulations in physiological processes, including fluoride transport and the carbohydrate metabolism, are involved in the occurrence of fluoride resistance. Upon acquiring fluoride resistance, bacteria exhibit phenotypic changes. They show differences in abilities to grow, produce acid, form biofilms and tolerate environmental challenges. These changes may lead to differed capacity of fluoride-resistant *S. mutans* to cause caries in the oral cavity. The investigation of fluoride resistance in oral bacteria is important to the evaluation of the role of fluoride in caries prevention, and beneficial to our understanding of the “drug-bug” interaction.