Volume 12

Washington University
Undergraduate Research Digest

Spring 2017

Local Adaptation and the Role of Carried Symbionts to Thermal Stress in a Social Amoeba Dictyostelium discoideum

Xinye Qian
Washington University in St. Louis

Local Adaptation and the Role of Carried Symbionts to Thermal Stress in a Social Amoeba *Dictyostelium discoideum*

Xinye Qian

Mentor: Joan Strassmann

Environmental stress can result in strong ecological and evolutionary effects on natural populations. In this project, we study adaptive divergence of thermal tolerance in the social amoeba *D. discoideum*. In addition, we test the hypothesis that some of the amoeba symbionts, such as the *Burkholderia* bacteria, could help amoeba survive the thermal stress.

D. discoideum generally lives best at a temperature around 22 degrees Celsius. It is very sensitive to thermal stress and most cannot function well or even fail to survive at higher temperatures. However, some types of amoebae were found in many places with high temperatures across the country, including Texas. To get insight into the difference among the heat-tolerance of populations, we took samples from two populations that differ in climate (Virginia, VA and Texas, TX). We tested them under moderate and thermal conditions and measured their fitness (using spore counting). We found that TX population had higher fitness than VA population under thermal condition, while there was no difference between them under moderate condition. These results suggest that Texas population has locally adapted thermal stress.

When *D. discoideum* clones are collected from the wild, some carry bacterial symbionts (farmers) while others do not (non-farmers). There are benefits and costs of carrying symbionts. In this project, we are currently testing the hypothesis that the *Burkholderia* bacteria, one of the major symbionts, could help amoeba survive the thermal stress.