CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

Emmanuel P. Chan

Project Number

31831

Project Title

Development of a High Throughput Real Time PCR Assay for Rapid Detection of Helicobacter Bacteria

Abstract

Objectives/Goals

Helicobacter bacteria can be found in human and various animals. Some members of this genus are associated with gastric diseases and cancer formation. The diagnosis or screening of Helicobacter infection by culture method is difficult because of low sensitivity. In this report, a genus-specific high throughput real time PCR (polymerase chain reaction) procedure is developed to rapidly screen for subjects potentially colonized with Helicobacter bacteria.

Methods/Materials

Consensus PCR primers designed over the 16S rRNA gene of Helicobacter bacteria were used in a real time PCR reaction that incorporated a proprietary DNA binding fluorescent dye. Quantified H. pylori DNA was used to determine the lowest detection limit, and the intra-assay and inter-assay variations of the assay. The specificity of the assay was checked against twenty-nine bacterial DNAs.

Results

A flagpole that measured 150 centimeters was set perpendicular to the ground. The length of the shadow measured and recorded at 2:00 pm every five minutes until 2:30 pm for ten days. The angle of the Sun that produced each length was then calculated using trigonometry.

Conclusions/Discussion

A genus-specific real time PCR using DNA binding dye technology is developed for the detection of Helicobacter bacteria. Real time monitoring of amplification signal eliminates further processing of resultant PCR products before detection, increases the throughput of the assay and minimizes cross-contamination.

Summary Statement

A genus-specific and sensitive real time PCR assay was developed for detecting Helicobacter bacteria.

Help Received

Used lab equipment from Zoologix, Inc. under the supervision of Dr. Perry Chan