Effect of Green Tea and Garlic on Gastric Cancer Cells In Vitro Study. STEPHEN W. LI1, Qiang Shen2, and Xuejun FAN3. 1Clear Brook High School, 4607 FM 2351 Friendswood, TX 77546; 2Breast Cancer Center, Baylor College of Medicine, Houston, TX 77030; and 3Department of Hybridoma Lab, Diagnostic Systems Laboratories, INC, 445 Medical Center Blvd., Webster, TX 77598. Email: jfan@dslabs.com

Millions of Americans suffer from peptic ulcer and gastric cancer. To combat these health problems, medical scientists have researched and discovered that Helicobacter pylori (H. pylori) are strongly associated with peptic ulcer and gastric cancer. Green tea contains many polyphenolic compounds (catechins), including the most important and dominant catechin, (+) Epigallocatechin Gallate (EGCG). Garlic contains organosulfur compounds, which are potent antioxidants. Therapeutic actions of green tea and garlic have been attributed primarily to its catechins and organosulfuric compounds, but more specific studies are needed to better clarify its pharmacological properties. Therefore, I have studied how green tea and garlic extracts kill the gastric cancer cells directly or indirectly by killing the H. pylori bacteria. Also, I examined how green tea and garlic extracts affects other types of cancer cells besides gastric cancer cells. In this project, I have designed three different experiments. First, the H. pylori were culturing together with different concentration of green tea (0.5, 5, 50 mg) and garlic (2, 20, 200 mg) extracts on blood agar plates for 3 days. Then, the gastric cancer cell lines (N87 and AGS), breast cancer cell lines (MCF-7 and T47D) and colon cancer cell line (CaCo2) were treated with different concentration of green tea (0.5, 5, 10 mg) and garlic (2, 20, 40 mg) extracts on 96-well plates for 4 and 8 hours. Then the amount of BrdU incorporated into live cells during DNA synthesis was measured by an ELISA reader. In order to prove my hypothesis, cell proliferation was evaluated by the cell counting after gastric cancer cell lines (N87 and AGS), breast cancer cell lines (MCF-7 and T47D) and colon cancer cell line (CaCo2) were cultured with different concentration of green tea (5, 25 mg) and garlic (20, 100 mg) extracts on 48-well plates for 4 hours. To demonstrate that the green tea and garlic extracts only kills cancer cells but not normal cells; a control experiment was performed. My peripheral mononuclear blood cells (PBMC) were culturing together with different concentration of green tea (5, 25 mg) and garlic (20, 100 mg) extracts on 48-well plates for 4 hours and then the number of live cells and dead cells were counted. The results illustrated that on blood agar plates showed that H. pylori growing were inhibited by green tea and garlic extracts at higher concentration. The results demonstrated that there were significant decreases in the DNA synthesis for all the cancer cell lines (above) after being treated with green tea and garlic extracts. For cell counting results, there were significant decreases in the number of live cells and increases in the number of dead cells for all the cancer cell lines (above) after being treated with green tea and garlic extracts. In the control experiment, the PBMC remained unaffected. In conclusion: the green tea and garlic extracts were extremely effective in killing H. pylori, and gastric cancer cells, breast cancer cells, colon cancer cells. My data strongly supports the idea that green tea and garlic extracts works as an anti-carcinogen and aid in prevention and treatment of gastric cancer cells as well as other cancer cells.