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research narrative

Medicinal Benefits of Green Tea?

Adam Threet, Natalie Mitchell

Cancer has forever remained a seemingly taboo topic amongst society; however, as scientists advance closer to locating a cure for the disease, the general public continues to develop an extremely positive attitude toward efforts in the laboratory. Undoubtedly, as forward progression results, the majority of society becomes increasingly interested in this subject matter. Through improved awareness, individuals freely converse about aspects of cancer and develop personal responses to related ongoing events as dictated by media coverage. Yet, the question of when absolute effective treatment will be discovered for the disease still remains uncertain. Dr. Trygve Tollefsbol, of the UAB department of biology, believes a beverage may hold the answer to the aforementioned problem.

Clearly, the same idea depicted in the data relates to the research currently being conducted by Dr. Tollefsbol. Nearly all of the breast cancer cells ceased growth (indicated in red and labeled 100% inhibition) when introduced to LPA and EGCG.

Laboratory Experience:

Visiting Dr. Tollefsbol's laboratory in conjunction with the Science and Technology Honors Program provided a valuable freshmen experience. This unique opportunity, not provided to many students until junior or senior year of undergraduate level, allows students to learn about current faculty research and participate in hands-on experiences. Certainly, the level of work produced by professors initially seems rather intimidating; however, upon entering Dr. Tollefsbol's laboratory, an extremely calm atmosphere emerged, easing any nerves present. After meeting with Dr. Tollefsbol to discuss his current efforts and our questions, we completed various stations developed by his researchers to simulate important biotech-

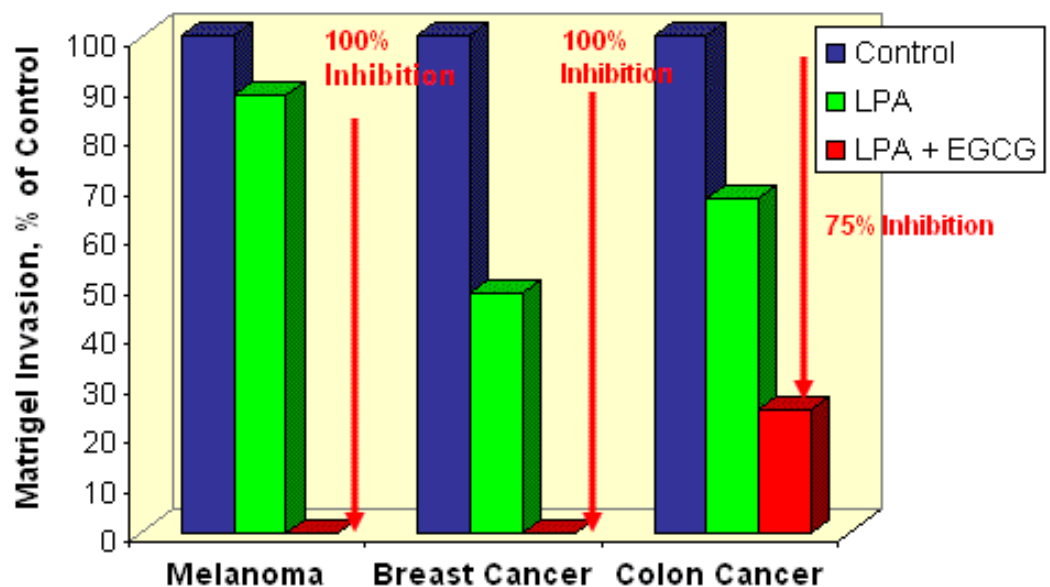
The integration of students into a laboratory setting where new research is being conducted provides a valuable experience regarding a rather innovative topic.

Research Focus:

His research concerns aging epigenetics, a process in which heritable changes occur that do not involve mutations but rather modifications of DNA. The proliferation of cancer cells may ultimately be attributed to the presence of telomerase, which typically maintains the length of chromosomes. Located in only stem and cancer cells, the presence of this enzyme allows such cells to continually replicate without death. Green tea consists of several components that may help reduce or treat various medical conditions. The drink contains certain antioxidants (catechins/polyphenols) that may selectively inhibit the growth of cancer. In particular, EGCG affects the activity of telomerase, eventually causing these cells to be unproductive due to the inability to replicate. The inhibition of cancer cells due to the presence of LPA and EGCG is indicated in the following graph completed in a study done by Netke, et. al (2003):

nology techniques. The major aspect of inquiry was whether or not EGCG inhibited DNMT1 expression in cells. Overexpression of DNMT1 has been detected in several cancers due to increased methylation. Following protocols resulted in the ability to emerge with knowledge concerning the significance of correctly adhering to lab procedures. The importance of proper equipment use was stressed more so than actual experimentation results. Thus, we only briefly discussed

Nutrient Synergy Inhibits Cancer Cell Matrigel Invasion



the expected outcome present through photographed gels using a UV transilluminator. Armed with the information that EGCG does inhibit DNMT1 expression, students were able to create additional research questions:

1. Is there another polyphenol besides EGCG that might inhibit the growth of cancerous tumors? If so, does it slow down or stop the replication of another gene besides DNMT1 related to cancer growth?

2. Is there another gene or sequence of genes that EGCG needs to target to repress the growth and stop the spreading of cancer?

The development of such questions clearly stimulates independent thinking, a valuable characteristic when working in such a setting.

Dr. Diane Tucker, director of the UAB Science and Technology Honors Program, selected the visit with Dr. Tollefsbol due to the exponential-like growth taking place in the area of cancer therapies. Thus, the integration of students into a laboratory setting where new research is being conducted provides a valuable experience regarding a rather innovative topic. In addition, the development of personal responses to such subject matter encourages the creative thought process. This ultimately provides the opportunity to determine a particular field of interest to complete a research proposal.

Societal Implications:

While recent work regarding ceasing the expression of the DNMT1 gene and inhibiting tumor growth has occurred, much more experimentation must be completed to apply this knowledge to other cancer types. Since EGCG does slow down the replication of DNMT1, one must ultimately question the amount of tea consumption necessary to achieve effective results. Perhaps drinking boiled green tea leaves as opposed to the bottled beverage also yields contrasting outcomes. Undoubtedly, additional research needs to be conducted to obtain concrete data. Until this occurs, it is ultimately up to the consumer to decide the means in which to alter diets to receive the benefits of green tea.

Work Cited

Netke SP, et al., (2003) A specific combination of ascorbic acid, lysine, proline and epigallocatechin gallate inhibits proliferation and extracellular matrix invasion of various human cancer cell lines. *Research Communications in Pharmacology and Toxicology: Emerging Drugs*. 2:37-5.