# Characterizing Matcha Green Tea as an Anti-Cancer Agent

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Deregulation of the tumor suppressor p27kip1 results in the proliferation of common and aggressive cancers such as breast and prostate cancer. The purpose of this study is to investigate the potential anti-cancer properties of Matcha Green Tea (MGT) on immortalized cell lines with deregulated p27kip1 (-/-) and to test its possible effectiveness as a cancer drug. Initial experiments tested MGT's effects on cell metabolism. MGT caused a dose dependent and rapid decrease in cellular ATP levels that would compromise cell function. Since immortalized cells rely mainly on glycolysis, I hypothesized a component in MGT was inhibiting some step in glucose metabolism. When cells were cultured in media containing galactose rather than glucose, MGT had no effect on cellular ATP levels. This suggests a component of MGT inhibits the enzyme hexokinase in glycolysis since the phosphorylation of glucose to glucose-6-phosphate (G6P) by hexokinase is bypassed in galactose metabolism. In addition, -/- cells metabolize amino acids to make ATP when glucose is not available. The glucose analog 2-deoxy glucose (2DG) was utilized to inhibit glucose metabolism in vitro in glucose containing media, forcing the cells to metabolize amino acids. When -/- cells treated with 2DG were also exposed to MGT, cellular ATP levels decreased, suggesting a component in MGT also inhibits amino acid metabolism. By isolating and further characterizing the compounds responsible for these different biological activities, it may be possible to separate MGT anti-cancer activity from that responsible for side effects. Future efforts will therefore focus on enhancing the therapeutic aspects of MGT while minimizing its detrimental attributes.