

The Effects of Cocoa Powder on the Cell Cycle and Ability to Induce Apoptosis in *Spodoptera frugiperda* Ovarian Tissue Cells

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Cancer is a medical phenomenon that takes the lives of more than 1,600 people per day, in the United States alone (American Cancer Society, 2014). More than 14 million new cancer cases are diagnosed each year, with new cases expected to rise 70% over the next 2 decades (World Cancer Report 2014). Cancer occurs when mutations occur in a cell's DNA, which affects checkpoints in the cell cycle. This causes rapid cell proliferation and cells that would normally undergo apoptosis, which is signaled cell death, are unable to. Current treatment methods for cancer are inefficient and cause severe side effects as the treatments are merely designed to kill cells- regardless of if these cells are cancerous or not. A new treatment method that can specifically target cell proliferation and induce apoptosis is vital to combating cancer. One such substance that has untapped potential in doing so is cocoa powder. Cocoa powder is the dry solid remains of fermented, then dried and roasted, cocoa beans. Cocoa beans are derived from the *Theobroma cacao*- the cocoa tree. Cocoa powder benefits include being rich in minerals, flavonoids, caffeine, and antioxidants. To test the effects of cocoa powder on apoptosis, *Spodoptera frugiperda* cells were damaged with UVC, which caused DNA mutations and cancer. Then cells were treated with four different concentrations of cocoa powder and grown for a total of 96 hours. It was found that cocoa powder had the reverse effect desired, actually exacerbating cancer growth. Thus, cocoa powder should actually be avoided.

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