Phase VII: Inhibiting Cancer Metastasis by Using EGCG To Target the 67 kDa Laminin Receptor

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Cancer is one of the most prominent diseases plaguing the world today, and causes thousands of deaths daily. The 67 Kilodalton Laminin Receptor protein (67 LR protein), whose primary function is to maintain structure of extracellular matrices throughout the human body, causes increased aggressiveness of cancerous tumors. The purpose of this study was to determine if epigallocatechin-3-gallate (EGCG), a polyphenol primarily found naturally in green tea leaves, binds to the 67LR protein. A plasmid was modified using DNA primers and Polymerase Chain Reaction to obtain an accurate DNA plasmid sequence for the 67LR protein. The plasmid was then transformed into BL21(DE3) cells which produced 67LR protein when induced with IPTG. The BL21(DE3) cells were then lysed using a French Press and the contents were added to a liquid chromatography system to isolate the 67LR protein from the rest of the cells. After acquiring isolated 67LR protein, various Biolayer Interferometry (BLI) spectra were obtained from the protein sample and a 1,3,10 logarithmically scaled set of concentrations of EGCG. The BLI spectra were thoroughly analyzed to determine if there were shifts caused by binding between the 67LR protein and EGCG. The spectra showed that the EGCG bound to the 67 Kilodalton Laminin Receptor protein. The results suggest that in the future, EGCG could be used to target and incapacitate the 67LR Protein to prevent it from causing increased cancerous tumor aggressiveness in humans.