

Effects of Hormones in Relation to the Differentiation of Terminal End Buds in the Rat Mammary

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Background: Inside the mammary gland of a female rat, structures known as terminal end buds can become tumorous after exposure to carcinogens, causing the development of breast cancer. The best time for the terminal end buds to further differentiate into innocuous structures is during the Window of Susceptibility. In a rat's life, this is from 35 to 55 days old. At this time, if a female is impregnated, there is a much lower chance of developing breast cancer. This is mainly due to the large amount of hCG that is produced in the body, which leads to the differentiation of terminal end buds.

Objective: To study the preventative properties of various peptide groups extracted from the hormone hCG, different treatments including three of these peptide groups, estrogen, progesterone and hCG itself were administered to Sprague-Dawley rats. We had to compare the different effects of the treatments on the rat mammary glands, to see which would further differentiate terminal end buds into different structures, resulting in a decreased chance of developing breast cancer.

Work performed: Throughout the duration of this experiment, the experimenters counted the structures of the mammary glands in order to understand the effects of each treatment group on terminal end buds. Many whole mounts of mammary glands of rats treated with the groups were analyzed, and the number of structures were recorded for each animal. After comparing and analyzing our collected data, we concluded which hormone/peptide worked most efficiently to reduce terminal end buds. Based on our observations, we noticed that one hormone/peptide proved more effective than the others. This hormone/peptide was able to reduce the amount of terminal end buds in the treated rats.

Conclusion: We concluded that out of the three peptides tested, one worked significantly better than the others. This proved that it is possible to greatly reduce terminal end buds in the mammary glands, which would ultimately reduce the risk of breast cancer. This research will lead to more experiments, which may include testing other peptides from hCG and hormones with the goal to achieve more helpful conclusions. Further investigations could include testing different hormones found in the human body that may have similar or even greater effects on the mammary gland. This would provide a naturally occurring hormone that is easier to create, extract, and administer to the patient.

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