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Investigation of DNA Damage Induced by Alkylating Agents and Repair Pathways by Cooperating Mechanisms Driving the Formation of Colorectal Adenomas and Adenocarcinomas Using DNA Alkylation and DNA Methylation

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Abstract

In this recent study, DNA data from 900 patients with colorectal cancer were reviewed. Analysis of the data showed a distinct mutation signature, a pattern that had never been identified before but indicated a type of DNA damage called "alkylation." Red meat contains chemicals that can cause alkylation. High levels of tumor alkylation damage are seen only in patients who consume an average of more than 150 grams of meat per day, roughly equivalent to two or more meals. On the other hand, a group of researchers in 2019 in a controversial conclusion stated that they do not have much confidence in reducing deaths from colon cancer by avoiding red meat.

Keywords: Cancer; Cells; Tissues, Tumors; Prevention, Prognosis; Diagnosis; Imaging; Screening; Treatment; Management

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Introduction

Consumption of red meat is less recommended in medical standards for the prevention of colon

cancer, but the method of cell mutation is still unknown and all experts are convinced that these two factors are related. A new article in Cancer Discovery now identifies specific patterns of DNA damage from red meat-rich



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diets, in addition to treating the food as carcinogenic and increasing the likelihood of early detection of cancer. Introduces a new treatment method. Previous research has been largely epidemiological, meaning that people with the disease have been examined for eating habits, and researchers have found an association with the incidence of colon cancer. In 2019, a team of researchers, despite not being 100% sure, created a new wave when they announced that reducing meat consumption could prevent death from bowel cancer. When we say that red meat is carcinogenic and causes cancer it must be that there must be a good reason for doing so; Scientists have long ago discovered which chemical in cigarette smoke can cause cancer and how certain groups of ultraviolet light penetrate the skin and cause mutations in genes that control how cells grow and divide. Analysis of a symptom showed a distinct mutation, a pattern that had never been identified before, but indicated a type of DNA damage called "alkylation." Not all cells containing these mutations will necessarily become cancerous, and this symptom was present in some colon samples. The sign of the mutation before the patient was diagnosed with cancer was related to the consumption of processed and unprocessed red meat, not to the consumption of poultry, fish or other lifestyle factors that were examined. Some chemicals can cause alkylation by consuming red meat. Specific compounds are nitrogenous compounds that can be produced from each other, which are abundant in red meat, as well as nitrates, which are often found in processed meat. In this study, mutation patterns were strongly associated with the colon, the lower part of the intestine leading to the anal canal, where previous research has shown that red meat-related colon cancer is more common; In addition, among the genes most affected by alkylation were genes that, according to previous research, were the most important causes of colorectal cancer during mutations. Compared to patients with lower injury rates,

they are 47% more likely to die from colon cancer [1-510].

Results and Discussion

Intestinal polyp is a pre-cancerous fleshy lesion that takes an average of about 10 years to develop into colon cancer. About 5 to 10 percent of polyps usually develop into cancer. Also, in people over 50, between 20 and 30%, intestinal polyp lesion occurs and it is necessary to examine and remove this lesion, because if the intestinal polyp remains in the body, it increases the risk of cancer. Polyps can be easily seen through screening, and with the help of colonoscopy we can remove this lesion from the body. Screening programs are required for people over the age of 50 and healthy people who have no symptoms or family history of the disease. With this method, we can identify and treat polyps. There are two methods for screening: One is a stool test, which is a home comfort test. If the test is positive, the person must remove the lesion with a colonoscopy, and if the test is negative, the person must repeat the test again the following year. The next method, which is much more accurate, is a colonoscopy, which should be performed every 10 years. This method easily identifies polyps and removes them from the body, and also diagnoses cancer at an early stage. Age is the most important cause of colon polyps. Age over 50 is a risk factor for this disease. Another factor that causes intestinal polyps is inactivity and obesity. People who are not active enough are more prone to polyps and bowel cancer than others. Foods such as red meat and fatty foods can also increase the risk of intestinal polyps, but fresh fruits and vegetables reduce the risk of intestinal polyps. Genetic factors are also a cause of intestinal polyps. People with a family history of polyps or bowel cancer are more likely to get the disease than normal people. There are currently the best colorectal cancer screening and prevention programs that identify cancerous lesions 10 years before they occur.



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Conclusions

Future research may help physicians determine which patients are genetically predisposed to alkylation damage, so we are advised to reduce their red meat intake. Identifying patients who have already shown symptoms of the mutation can help identify those who are at higher risk for cancer or early-stage disease, and since alkylation damage appears to indicate survival, it can be used to tell patients' prognosis. Finally, understanding the biological pathway through which colon cancer occurs paves the way for drugs that stop or reverse the process and prevent the disease. The message of this study is not that people should avoid red meat altogether: My advice is to have a balanced diet.

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Authors' Brief Biographies





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