



Can exposure to fire alter your DNA?

Goodrich J.M., Furlong M.A., Caban-Martinez A.J., Jung A.M., Batai K., Jenkins T., Beitel S., Littau S., Gulotta J., Wallentine D., Hughes J., Popp C., Calkins M.M., Burgess J.L., "Differential DNA Methylation by Hispanic Ethnicity Among Firefighters in the United States." *Sage Journals*, 2 March 2021. Summary by Devin Ritter.

Studies show that firefighters are at a much higher risk of getting cancer than other careers due to their exposure to dangerous burning products. Firefighters are specifically at risk of getting cancer in their bladder, skin, digestive tract, blood, prostate, and testes. In this study, researchers wanted to find out if cancer risk differs between different races and ethnicities. They tested ethnicities classified as Hispanic and non-Hispanic to determine DNA methylation differences between them.

Researchers wanted to find out how DNA methylation varied across different ethnicities. To find their results, researchers determined how DNA methylation in Hispanic firefighters vs. non-Hispanic firefighters changed cell interactions with PAHs - polycyclic aromatic hydrocarbons - which are known to cause cancer.

Study results showed that differences in DNA methylation between ethnicities resulted in different cancer risks for those ethnicities. Generally, Hispanic firefighters had higher rates of DNA methylation, so they were less likely to get certain cancers. (This is because DNA methylation is a healthy process that helps block harmful genes.) However, methylation for certain genes were lower for Hispanic firefighters. This resulted in an increased risk of getting prostate cancer, renal cell carcinoma, and lymphocytic leukemia.

Although differences in cancer risk were apparent between different races and ethnicities, researchers do not know exactly why this happens. One possible reason for this is exposure based on location. Perhaps there is a correlation between busier stations and higher exposure risk. Another explanation would be the genetic differences between ethnicities. These genetic differences could cause lower or higher rates of DNA methylation, therefore resulting in lower or higher ability to alter or block harmful genes.

What is DNA Methylation?

DNA methylation is a process that changes the activity of the DNA without changing the sequence of the DNA. This process can "fix" or "alter" genes, and is very important to healthy growth because it helps block dangerous genes.

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