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Are Mutational Biases Causing Cancer?

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Cancer is one of the leading causes of human death. Understanding the development of this disease is fundamental to improving prevention and treatment. Our research studies differences in mutational patterns between cancerous and normal cells, as mutations are known to be critical to cancer development. Mutations can be classified as either transitions or transversions, and the transition:transversion bias is an important characteristic of new mutations. Unicellular organisms have been previously shown to access more beneficial mutations, and hence grow faster, if this bias is reversed. By analyzing existing data from human cells, we found that this bias is typically reversed in cancer compared to normal tissues. This is interesting because cancer cells have a selective advantage and outgrow normal cells as cancer develops. More data analysis will examine detailed mutational patterns in cancer cells, and the impacts of bias reversal in cancer are being investigated through simulations.

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