

## CANCER CONCERN



Many of our readers may have seen news reports suggesting cancer is caused by bad luck dominating newspaper headlines a few weeks ago. The report created a mixed reaction amongst the common people. Those who could not get out of the habit of smoking, chewing *gutkha* etc. felt happy that they could continue with their own lifestyle and cite this news item as a shield when admonished by their spouses. Those who maintained a disciplined lifestyle with healthy diet, and physical exercises etc. felt crestfallen and cursed for the austerity they maintained leaving aside many of the joys of life they and their spouses missed. I myself have received phone calls from friends with reactions of the second category.

The origin of this report is a paper published in the 2<sup>nd</sup> January 2015 issue of the journal *Science* by Dr. Cristian Tomasetti and Dr. Bert Vogelstein of John Hopkins School of Medicine in the US. The two scientists in their paper tried to establish a mathematical formula to understand the genesis of cancer, or more simply why some types of cancer are more common than others. The study compares the number of lifetime cell divisions in stem cell divisions in a number of tissues in the body

with the lifetime cancer risk and suggest that random mutations, which is equivalent to 'bad luck', are the "major contributors to cancer overall, often more important than either hereditary or external environmental factors." Before delving further inside, it is proper to discuss a little about what cancer is and how it is caused.

Cancer occurs when cells in a specific part of a body begin to mutate and reproduce uncontrollably. Cancerous cells can then invade other parts of the body and cause 'metastasis'. It is known that some tissue types are more susceptible to cancer than others. This is because with every cell division there is a chance of cancer causing risk of mutation in the daughter cell. Therefore, chance of mutation is large for the cells that divide the most. All cells in the tissues of our body do not divide at the same rate. Some

of the tissues are fairly stable, such as the tissues in the brain or in muscle. On the other hand, cells in the linings of our intestine are constantly being regenerated and therefore the chances of mutation are larger and the risk of cancer is more. What Tomasetti and Vogelstein did is that they studied tissues from different organs of the body and identified what percentage of them are long-lived stem

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cells and determined how many times the stem cell divided. By plotting a graph of lifetime risk with number of cell divisions and using simple statistical analysis they found a correlation factor which shows that in 65% of all cancer cases, cancer risk is correlated with the rate of stem cell

divisions (see Figure on p.145). In such a graph, if the points are scattered all over the plot then it is said to have no correlation (correlation factor 0) between the two, and if it is a perfect straight line it is called 100% correlated (correlation factor 1). One has to understand that researchers were not looking at why some people get cancer and others do not, but why some types of cancers are common while some other types are rare.

This finding has been publicized in media as if the environment and other external factors are of no concern in cancer. This interpretation bears such a serious negative consequence from the point of view of cancer research and from public health perspectives that the International Agency for Cancer Research (IACR), which is a specialized cancer agency of the World Health Organization (WHO), sprang into action to point out serious contradictions.

IACR Director Dr. Christopher Wild remarked “Concluding that ‘bad luck’ is the major cause of cancer would be misleading and may detract from efforts to identify the causes of the disease and effectively prevent it.” He pointed out that five decades of epidemiological research suggest that most cancers that are frequent in one population are relatively rare in another, and that these patterns vary over time. For example, oesophageal cancer is common among men in East Africa but rare in West

Africa; colorectal cancer, once rare in Japan, increased four times in two decades. No doubt there is a chance factor, but on the other hand, all these observations are consistent with environmental and lifestyle exposures as opposed to mere chance (bad luck). This is like driving a car in a street. There is no doubt that the more you drive the more is the chance of an accident, equivalent to more cell divisions increasing the chance of mutation. But external factors like driving on an icy street or during inclement weather increases the risk of accident, similar to increased risk of cancer when one smokes.

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Some have started blaming the media for propagating this misinformation. Some opined that ‘Journalists are a class of people who understands something, writes something else’. However, this is not fully correct in this particular case. The headline of the

editorial of the journal *Science* itself was “the bad luck of cancer” with the subheading “Analysis suggest most cases can’t be prevented” may give a wrong signal to many, including journalists who are not specialists.

So behold all smokers: if you smoke, you greatly increase your chance of lung cancer. And for those who always look for more antioxidants, continue enjoying your green tea. □

**S. C. Roy**

*Attention of the readers is drawn to a new series “I DIDN’T KNOW THAT”, that will feature from this issue on words. The series originates from the visit to England and the USA in the summer of 2014. This is not a travelogue, neither is it an informative document on the places that we visited. These are some of the facts which I DID NOT KNOW before this travel. I hope our readers will enjoy reading it. – Editor*