Letter to the Editor

Mitochondrial DNA alterations in colorectal cancer cell lines

To the Editor:

We read the article by Chihara N et al. entitled “mitochondrial DNA alterations in colorectal cancer cell lines” with great interest. In this article, authors aimed to find potential roles of mtDNA alterations in colorectal cancers. In order to show mtDNA alteration, they sequenced entire mtDNA of eleven human-derived colorectal carcinoma cell lines. Many point mutations were detected. Some of them are previously found, but 4 homoplasmic and 6 heteroplastic single nucleotide polymorphism were novel. Three of 4 novel homoplasmic mutations were in protein coding region. One of 4 novel homoplasmic mutations and 3 heteroplastic mutations were located in the ribosomal RNA genes. There were many sequence alteration in control region of mtDNA. In discussion, these mutations have been related with possible structural change. In conclusion, they have emphasized that it is possible that those mutations cause low mitochondrial translation activity and be associated with cancer development.

There are many papers investigating relationship between mitochondria and cancer in literature. There are three major alterations for mtDNA: 1-point mutations, 2-Large scale deletions and 3- mtDNA Depletions¹. One of them can cause mitochondrial dysfunction. For example, mitochondrial encephalomyopathy, lactic acidosis, and stroke like syndrome occurs with point mutation, Kearn-Sayre syndrome occurs with large scale deletions and Alpers’ syndrome occurs with mtDNA deletions. The term of “mitochondrial DNA alterations” cover all these changes, but authors have checked just point mutations with sequencing. In mtDNA depletion syndromes, sequencing may not detect any point mutation, but tissue is defective for mitochondrial function. Although this study is well constructed, it is incomplete. These cancer cell lines may have large scale mtDNA deletions or mtDNA deletions. These alterations may also contribute to cancer development. So, authors should have checked these cancer lines for "large scale deletions” and “mtDNA deletions” or used a limited title like “mitochondrial DNA sequence alterations in colorectal cancer cell lines.”

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References

Author’s Reply:

Yasemin Gulcan Kurt et al. have asked a question whether our cell lines have mitochondrial DNA (mtDNA) with large scale deletions and/or deletions. First of all, I appreciate their indication. This is an important aspect because these mutations are directly responsible for mitochondrial dysfunction. We should indeed have mentioned the critical point in the article. Although Southern blotting is the most direct method for detecting large scale deletions and/or deletions, PCR mtDNA fragments could suggest the absence of large scale deletions and/or deletions. Actually, we could detect no significant difference in the levels of the bands of mtDNA fragments. Moreover, we could detect no clear additional bands in PCR. Although we could not exclude the possibility that these cancer cell lines have a small amount of large scale mtDNA deletion and a small decease in mtDNA amounts. I agree that further experiments will be required for detecting such small alternations.

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