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REPLY

Reply

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The article by Ullah et al. [1] published by us followed from the paper of Levine and co-workers [2], wherein these authors had expressed their inability to explain the molecular basis for the relative resistance of normal cells to the cytotoxic action of ascorbic acid. Our results are actually in support of the results of Levine and his group. However, they are an attempt to explain one of the aspects of the results of these authors. Therefore, as mentioned in the letter submitted by Rodemeister et al., the question of not supporting the results of Chen et al. [2] does not arise. Although we realize that we have not used tumor cells in our study, such work has already been done by Levine and his group and many other workers as mentioned in our paper. In the discussion of our paper, we say that based on our results with normal cells and the results of various other groups, it is our 'belief' that the preferential cytotoxic action of ascorbic acid against cancer cells is explained by the ability of ascorbic acid to mobilize endogenous copper ions. In support of our idea, we have also given several lines of indirect evidence in literature.

The second aspect about which Rodemeister et al. have reservations is the relatively low concentration of vitamin C (25 μM) used in our study. The strand break caused by such a concentration need to be viewed in the context of cellular DNA being in a homeostatic state of damage and repair. Although these experiments were done using viable lymphocytes, the fact remains that it was an ex vivo environment. It is possible that this situation deprives the cellular system of various cofactors required for efficient DNA repair. Thus, our results do not conflict with the accepted role of vitamin C as an antioxidant protecting cellular DNA against damage by ROS. Our contention is that an appropriate concentration of ascorbic acid leads to cell death only when there is an overload of mobilizable copper ions, such as in cancer cells.

The authors of the letter also refer to the paper of Wilms et al. [3]. The objection raised here is not tenable as it was shown by Wilms et al. that a concentration of even 10 μM ascorbic acid causes almost double the degree of DNA damage as compared with the controls in all the four polymorphic subgroups used. Similarly, ascorbic acid also leads to increased DNA breakage in the presence of H_2O_2 (Table 1; Wilms et al. [3]). Indeed, this is exactly what we propose in our paper as mobilization of endogenous copper would lead to increased production of H_2O_2.

References

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