Editorial

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Survivin may be a Key Target for Oxaliplatin

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Oxaliplatin, a third-generation platinum-derived chemotherapeutic agent, displays a wide spectrum of antitumor activity [1]. Similar to other platinum drugs, its biological activity is due to its ability to form lethal DNA lesions, including interstrand DNA crosslinks and DNA–protein crosslinks [2]. Oxaliplatin has fewer side-effects compared to other platinum drugs in terms of nephrotoxicity and myelosuppression [3]. Clinically, oxaliplatin effectively treats colorectal cancer in combination with fluorouracil and leucovorin [4]. However, the underlying molecular responses to oxaliplatin in colorectal cancer remain largely unknown.

In the present study, the authors investigated the effect of oxaliplatin on one colon cancer cell line, HCT 119. They demonstrated that oxaliplatin treatment inhibited the expression of the survivin protein and survivin mRNA in HCT116 colon cancer cells. The authors report that the expression of the survivin-2B variants, which have no antiapoptotic activity but control the cell mitosis by localization on a microtubule, was reduced continuously over the first two days following treatment with oxaliplatin. In immunocytochemistry, expression of survivin in the cytoplasm was reduced and, in particular, survivan was not expressed in microtubules and contractile rings.

The authors conjecture that the reason for the continuous decrease of survivin-2B, which is known to have little apoptosis inhibition effect among the survivin variants, might have been that survivin-2B failed to be positioned normally in the microtubule during the G2/M phase of cell cycle, thereby hindering the formation of a bipolar spindle during mitosis and, consequently, causing a mitotic catastrophe. According to the results of the authors' research, one of the working mechanisms of oxaliplatin may be that it not only causes apoptosis by inhibiting the expression of survivin but also impedes the formation of a bipolar spindle during mitosis as survivin fails to be positioned normally in the microtubule because it is not expressed properly in the microtubule or the contractile ring when the cells have reached the interphase of the cell cycle.

The authors' study is considered meaningful in that it contributes to an explanation of the molecular effect of oxaliplatin, which is used most commonly in chemotherapy for colon cancer. These data indicate that survivin may be a key target for oxaliplatin. The ability of oxaliplatin to induce different modes of cell death may contribute to its efficacy in treating colorectal cancer.

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