is not associated with the function of proteins of the Bcl-2 family (Falk et al., 1998; Constantini et al., 2000). On the other hand, apoptosis induction in both 38C13 and EL4 cells by thiol excess was found to be associated with a certain decrease in the level of antiapoptotic Bcl-2. However, there is no direct evidence that this change is related to the control of apoptosis induction.

Taken together, we can conclude that both thiol deprivation and thiol excess are able to induce apoptosis in lymphoma cells, but the sensitivity to thiol deprivation does not correlate with the sensitivity to thiol excess. We also conclude that p53 does not play a decisive role in apoptosis induction by thiol deprivation or by thiol excess. On the other hand, the control system of proteins of the Bcl-2 family could be somehow involved in the control of apoptosis induction by thiol excess but not in the control of apoptosis induction by thiol deprivation. The mechanism of apoptosis induction by thiol deprivation is related to the function of a free SH group, probably to its function in maintaining the required intracellular redox state of thiols. The mechanism of apoptosis induction by thiol excess is likely related to the effect of an excess of reductants. However, further studies are required to elucidate both mechanisms of apoptosis induction completely.

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