DNA binding and cleavage properties of ponicidin

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ABSTRACT

Aims and background. Ponicidin, an effective component isolated from Isodon rubescens, possesses anticancer properties. In the present study, we proved its ability to bind to and cleave DNA. DNA binding and cleavage properties are important for designing the rational construction of new and more efficient drugs targeted to DNA, because DNA is the biological target with which many anti-tumor drugs and potential antineoplastic agents interact. The characterization of interaction of ponicidin not only provides insights into its biology, but also gives the opportunity for developing effective therapeutic agents for control of gene expression.

Methods. The interaction of ponicidin with DNA has been explored by using absorption spectroscopy, fluorescence spectroscopy, viscosity measurement, thermal denaturation and electrophoresis measurement.

Results. Firstly, adding ponicidin to a DNA solution could shift the absorption spectra to red. Secondly, ponicidin also raised the melting temperature and viscosity of DNA. Moreover, fluorescence of DNA binding with ethidium bromide was quenched by ponicidin. Finally, ponicidin showed nuclease activity.

Conclusions. We propose that the DNA binding and cleavage properties of ponicidin may underlie the mechanism of its cell toxic effects.

Key words: cell toxicity, DNA binding, ponicidin.

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