Apoptin's functional N- and C-termini independently bind DNA

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Apoptin induces apoptosis specifically in tumour cells, where Apoptin is enriched in the DNA-dense heterochromatin and nucleoli. In vitro, Apoptin interacts with dsDNA, forming large nucleoprotein superstructures likely to be relevant for apoptosis induction. Its N- and C-terminal domains also have cell-killing activity, although they are less potent than the full-length protein. Here, we report that both Apoptin's Nand C-terminal halves separately bound DNA, indicating multiple independent binding sites. The reduced cell killing activity of both truncation mutants was mirrored in vitro by a reduced affinity compared to full-length Apoptin. However, none of the truncation mutants cooperatively bound DNA or formed superstructures, which suggests that cooperative DNA binding by Apoptin is required for the formation of nucleoprotein superstructures. As Apoptin's N- and C-terminal fragments not only share apoptotic activity, but also affinity for DNA, we propose that both properties are functionally linked.
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