GMR Genetics and Molecular Research
Online Journal
ISSN:1676-5680

Interactions between rare-earth ions and DNA of Bashibai sheep

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Genet. Mol. Res. 10 (2): 1075-1083 (2011)
Received September 20, 2010
Accepted December 30, 2010
Published June 7, 2011
DOI 10.4238/vol10-2gmr1070

ABSTRACT. The interaction between rare-earth ions and DNA from Bashibai sheep was studied by microcalorimetry and electrochemistry. The DNA chain was found to have four to five binding sites for rare-earth ions. The binding affinity was about 10^{-5}-10^{-6} M. It was also found that smaller ions caused more heat to be released in the process of binding and bound more readily to the nucleic acid chain. This is attributed to the enhanced ability of polarization of smaller ions and reduced steric hindrance compared to larger ions. The electrochemistry results show that rare-earth ions could be inserted into the DNA helix, producing a new complex with electrochemically active groups. The rare-earth ions and DNA complex reached equilibrium after a 90-min incubation at room temperature.

Key words: Rare earth; Nucleic acid chain; Microcalorimetry; Bashibai sheep

