

Genetic information 'created' by archaeobacterial DNA polymerase

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古細菌の DNA ポリメラーゼにより創造された遺伝情報

[Abstract]

DNA polymerase catalyses replication of cellular DNA. The reaction requires a primer-template complex, and a new DNA chain grows from the 3' end of the primer along the template; no genetic information is created in this reaction. We demonstrate that DNA polymerase from *Thermococcus litoralis*, a hyperthermophilic marine Archaea, can synthesize up to 50 000 bp of linear double-stranded DNA in the complete absence of a primer-template complex, indicating that genetic information is 'created.' The possibility of DNA contamination in the reaction mixture, which may serve as a primer and/or template, was vigorously excluded; for example, pretreatment of DNA polymerase with DNase I or extensive chromatographic purification of the substrate, deoxyribonucleoside 5'-triphosphates, did not abolish the primer-template-independent DNA synthesis. The DNA synthesized was (CTAGATAT)_n, (TAGATATCTATC)_n or a related sequence. Similar repetitive sequences are found in centromeric satellite DNA of many organisms. The significance of this *ab initio* DNA synthesis is that genetic information can flow from protein to DNA.

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