TWO TYPES OF HOMOLOGOUS DNA PAIRING ACTIVITIES ARE REVEALED IN RAT SPERMATOCYTE NUCLEI: PARTIAL PURIFICATION AND CHARACTERIZATION

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Two experimental systems for analyzing homologous DNA pairing activities have been used. DNA substrates of the first one included the supercoiled or linearized DNA of pBR322 plasmid or M13T943 bacteriophage (the latter is M13 DNA with the insertion of 943 bp from pBR322) and the 346 nt fragment of single-stranded DNA (ssDNA) of pBR322. DNA substrates of the second system consisted of the closed ring ssDNA of M13T943 phage and the 346 bp fragment of double-stranded DNA of pBR322. Two protein fractions possessing the discussed pairing activities have been revealed during a step of protein purification on ssDNA cellulose. One fraction contained a DNA transferase protein of about 100 kDa. It catalyzed only the reaction in the first experimental system in ATP-independent and Mg^{+2}-dependent manner. The rate of the reaction with supercoiled substrate was 3 times more than that with a linearized one. Another fraction with a DNA pairing protein of about 30 kDa provided only the reaction in the second system. It was both ATP- and Mg^{+2}-independent.