
The RF1 gene of the killer DNA of yeast may encode a DNA polymerase

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The killer plasmid k1 of the yeast *Kluyveromyces lactis* is a linear double-stranded DNA whose 5' ends are blocked by attached proteins like some animal viruses (1, 2). This genome contains four tightly packed genes of which three (RF2, 3 and 4) code for the killer toxin and the immunity determinant (3, 4, 5, 6). Only the function of the RF1 gene remains unknown. The aminoacid sequence of the RF1 product, deduced from its nucleotide sequence (4), has been compared with the gene products of other linear DNAs including animal viruses, a bacteriophage and a plant mitochondrial plasmid. We found, as shown in Fig.1, a significant homology with all of them at the three positions characteristic of viral DNA polymerase sequences (7, 11). Therefore, we suggest that (i) RF1 codes for a viral type DNA polymerase, (ii) the k1 genome does not code for its terminal protein (which may then be encoded by the companion plasmid k2 known to be necessary for the maintenance of k1), and (iii) k2 may also code for its own DNA polymerase, since the replication of k2 is independent of k1. The sequence of k2 still remains to be established.

	Segment A:	Segment B:	Segment C:
k1 RF1	(638) <u>LCLDVKSLYPASMAFYDQPYG</u>	(774) <u>VIKIIMNSLWGKFAQK</u>	(860) <u>AECIYSDTDSIFVHQE</u>
phi29	(245) <u>MVFDVNSLYPAQMYSRLLPYG</u>	(380) <u>LAKLMLNSLYGKFSAN</u>	(450) <u>DRIIYCDTDSIHLTGT</u>
S1 URF3	(482) <u>YYVDVNSLYPSSMLDDM-PIG</u>	(615) <u>TYKIMNSLYGRFGLS</u>	(711) <u>DDCYITDITDSVVVERE</u>
Ad2	(536) <u>VVYDIQGMV-ASALTPMHWG</u>	(693) <u>IAKLLSNALYGSFATK</u>	(864) <u>LKSVYGDITDSLFTFR</u>
HSV	(714) <u>VVDFASLYPSIIQAHNLCS</u>	(809) <u>AIKVVVCSVYGFQGVQ</u>	(880) <u>MRIIYGDITDSIFVLCR</u>
EBV	(583) <u>LVVDFASLYPSIIQAHNLCS</u>	(681) <u>AIKCTCNVYGFQGVQ</u>	(751) <u>LRVIYGDITDSLFTFCR</u>

Fig.1. RF1 aminoacid sequence was compared with the DNA polymerases from the bacteriophage phi29 (P2 gene)(8), the maize mitochondrial plasmid S1 (URF3)(9, 11), the adenovirus 2, the herpes simplex virus and Epstein-Barr virus (see 10 for virus references). The numbers refer to the aminoacid position within each gene. Homology with RF1 is underlined.

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