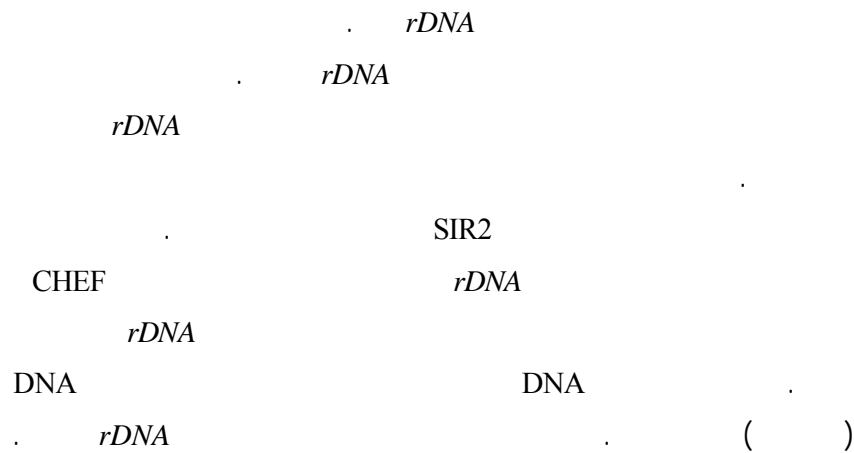


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شکست در هستک‌های ساکارومایسز سرویزیا



(DSB) CHEF : *rDNA*

Breaks in the Nucleous of *Saccharomyce Cerevisiae*

M. Motovali-Bashi and Z. Hojati

Department of Biology, University of Isfahan

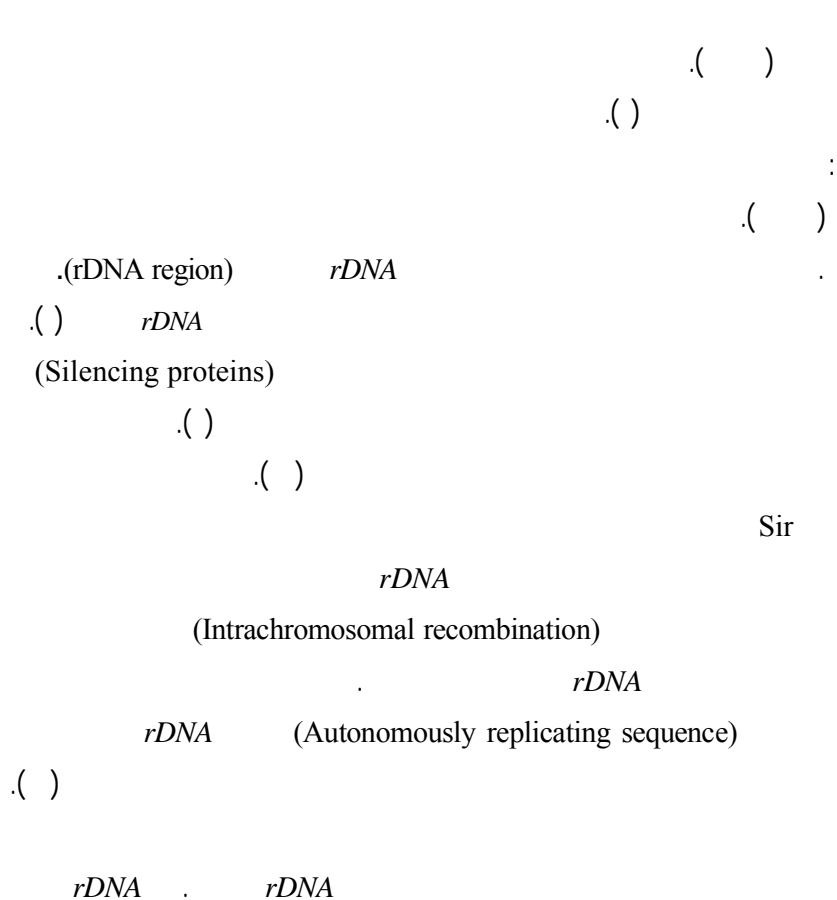
Abstract

The eukaryotic cells have one or more nucleolus in the nucleus. *Saccharomyces Cerevisiae* has a crescent nucleolus close to the nuclear envelope into which part of chromosome XII including repeated units of the rDNA genes is transported into crescent nucleolus of yeast. Studies on the recombination at this region show some crossing over between sister chromatid of chromosome XII. However, non-sister chromatid exchange of homologous chromosome XII is not observed at the rDNA region, suggesting in suppression of double-strand breaks (DSBs) at that region. It has been suggested that silencing proteins including Sir2 have important role in silencing state of chromatin for recombination. We studied the occurrence of DSBs at the rDNA region using pulse field gel electrophoresis via CHEF technique and restriction enzymes which can not cut within the rDNA unit. DSB's fragments were detected using an specific rDNA probe in Southern blot technique. Despite previous suggestions, results show some breaks in the nucleolus, which can not be detected using recombination techniques. This suggests that ultra-structure of

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chromatin in the nucleolus is completely different compared to that of the nucleus.

Keywords: *Saccharomyces Cerevisiae*, Pulse field gel electrophoresis (CHEF), Nucleolus, Double-strand breaks (DSB), rDNA gene



(Extrachromosomal rDNA Circle; ERC) rDNA

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(Unequal sister chromatid exchange)

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rDNA

rDNA

rDNA

rad50S

rDNA

rad50

(Double-strand Break; DSB)

3'

5'

()

(DSB recombination repair)

(Southern Blot)

CHEF

rDNA

(DNA recombination hot spot region)

CHEF (Pulse field gel electrophoresis)

(contour-clamped homogenous electric field)

rDNA

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rDNA

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rDNA

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.(;)

rDNA

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ORD1181

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UMIST

rad50

DNA

YEPD

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(*rad50S*) ORD1181

.()

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DNA

(Southern Blot)

.()

(probe)

rDNA

(random primer kit)

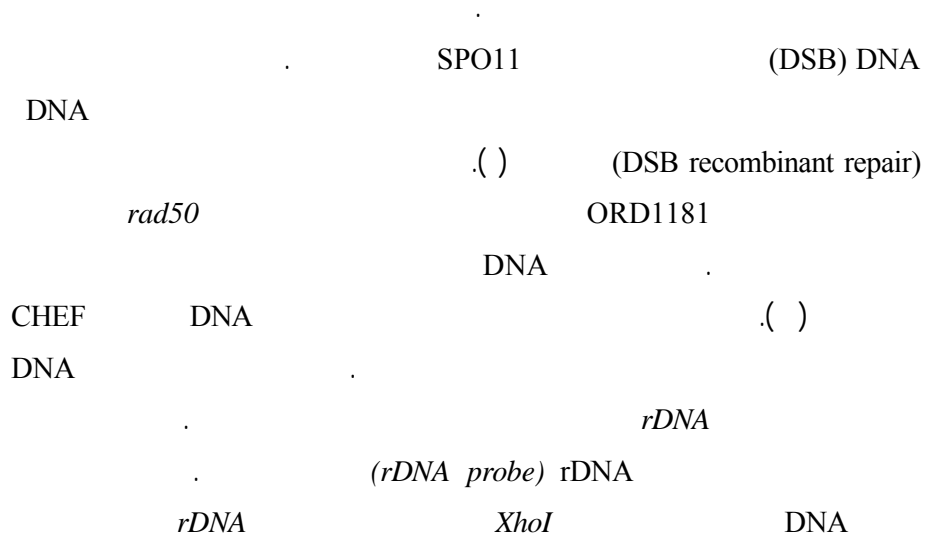
ORD1181

CHEF

DNA

DNA

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() ()

rDNA

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.()

(USCE)

rDNA

.()

(ORD1181) *rad50S*

(USCE)

.()

.() (DSB)

.()

rDNA

() *rDNA*

)

(DSB)

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(II)

SPO11

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.()

rad50S

DNA

DSB

DNA

rDNA

Guarente Sinclair

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rDNA

Sir2 (Silencing proteins)

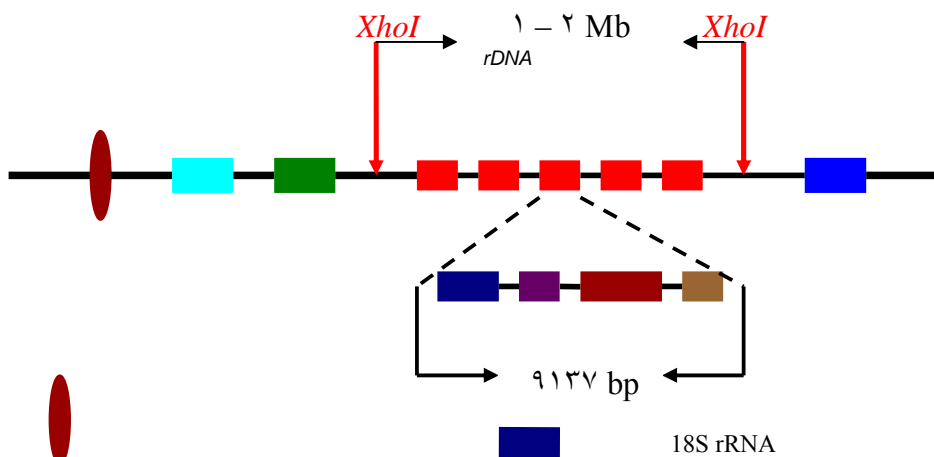
() *rDNA*
rDNA

(Intrachromosomal recombination)

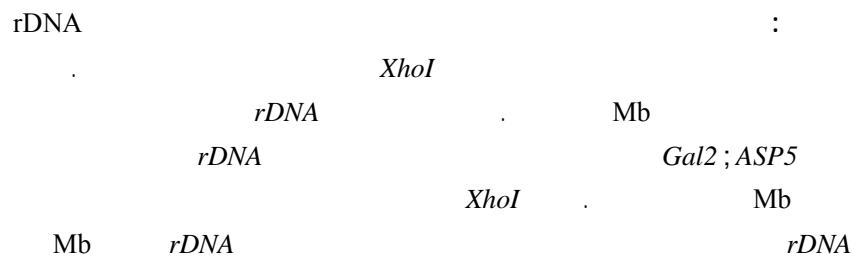
(Interchromosomal recombination) ERC

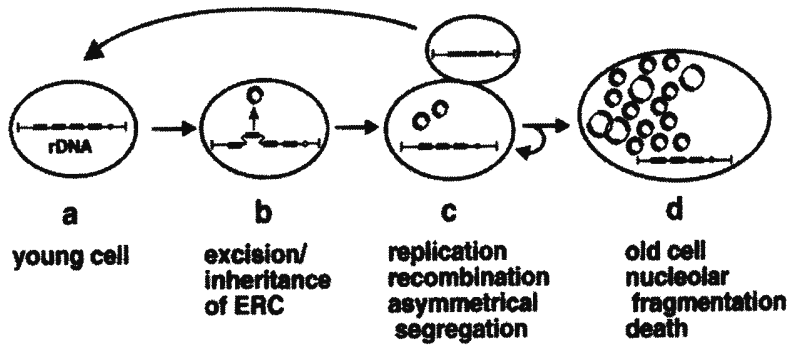
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Cell, 91, pp.

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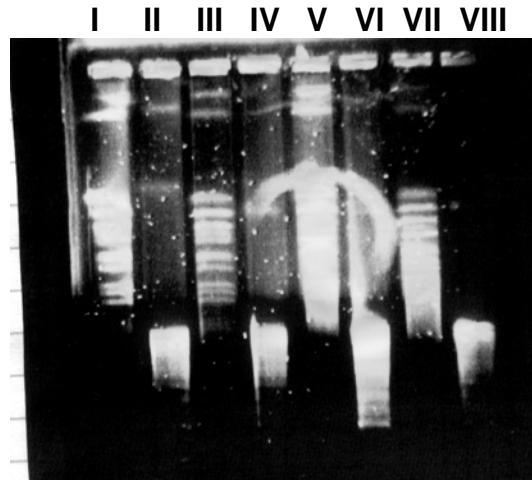
(ERCs) *rDNA*

DSB

(Intrachromosomal recombination)

ARS

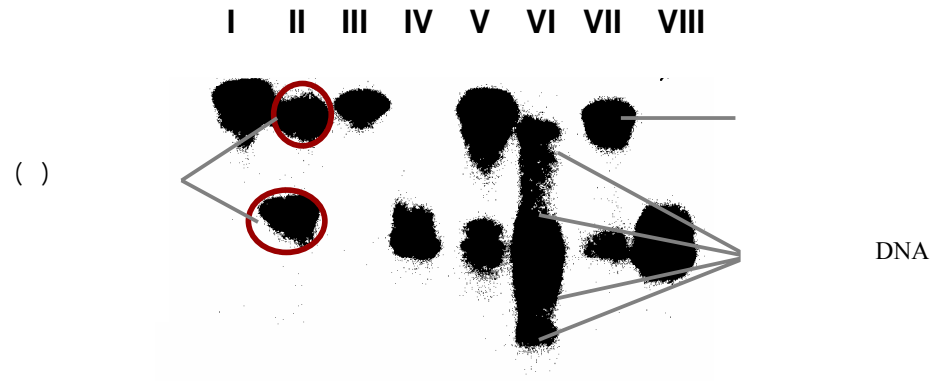
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DNA :
. CHEF

- . I
- . *XhoI* . II
- . III
- . *XhoI* . IV
- . V
- . *XhoI* . VI
- . II
- . VII
- . *XhoI* . VIII

/



rDNA

() CHEF :

		.I
	<i>XhoI</i>	.II
		.III
	<i>XhoI</i>	.IV
.I		.V
	<i>XhoI</i>	.VI
		II
		.VII
(rDNA)	
IV	<i>XhoI</i>	.VIII