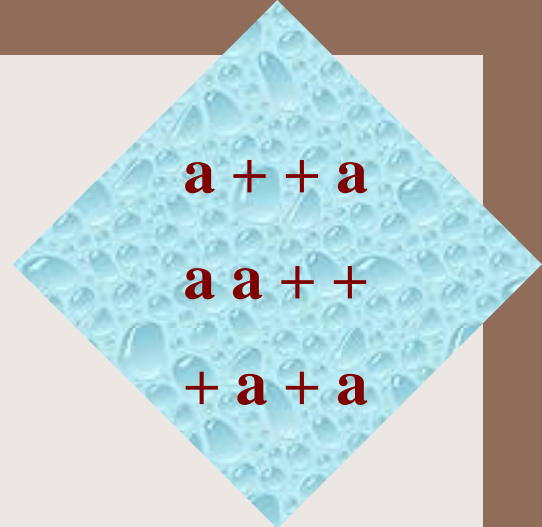
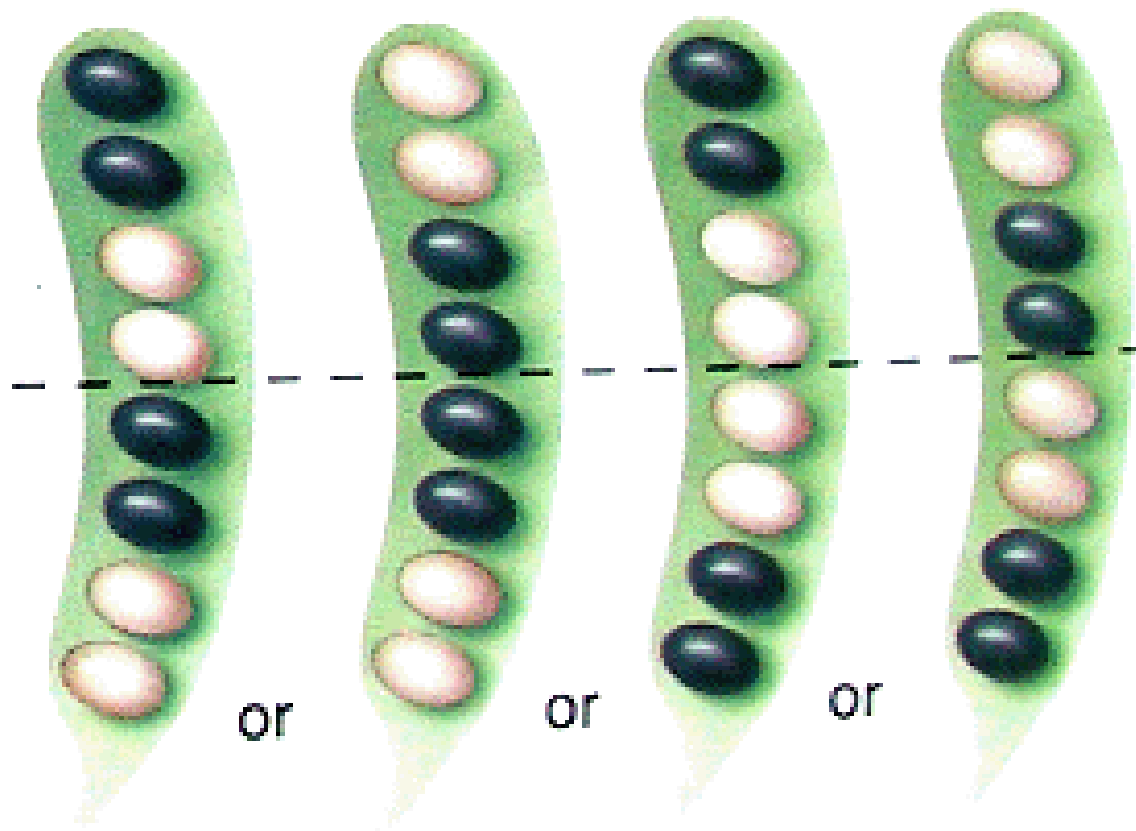
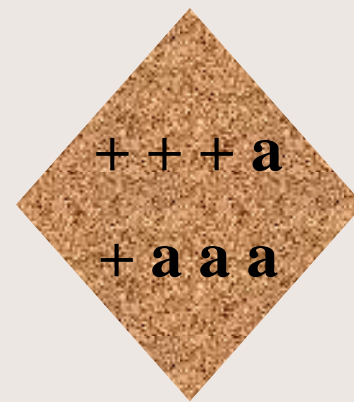


第四节 基因转变和重组机理

Segregation pattern of ascospores



正常



异常

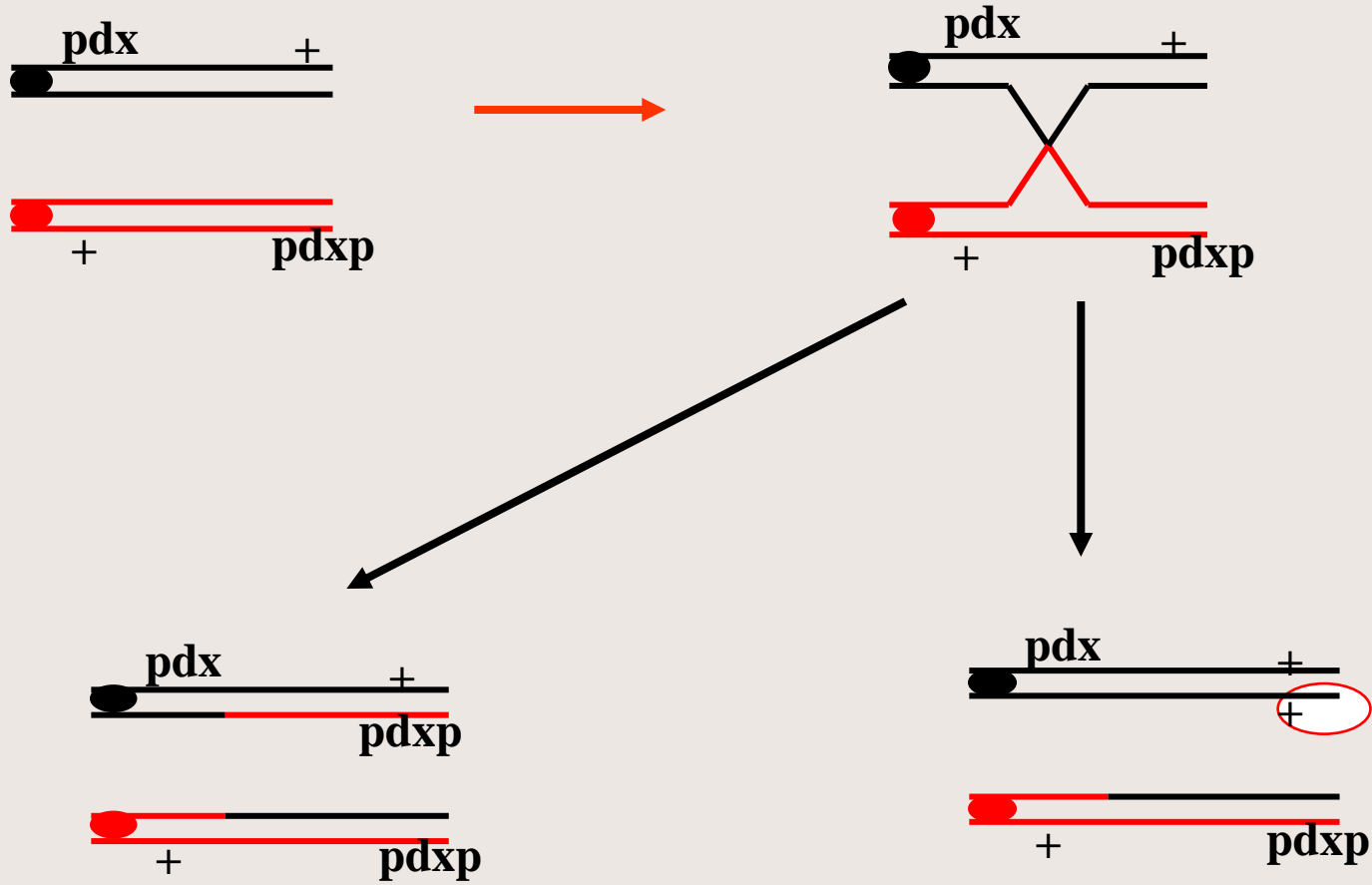
一、基因转变

★ 例1 Mitchell链孢霉的杂交试验

吡哆醇缺陷型

Pd_{xp}: 对PH敏感 **Pd_x**: 对PH不敏感

+ **pd_{xp}** × **pd_x** +



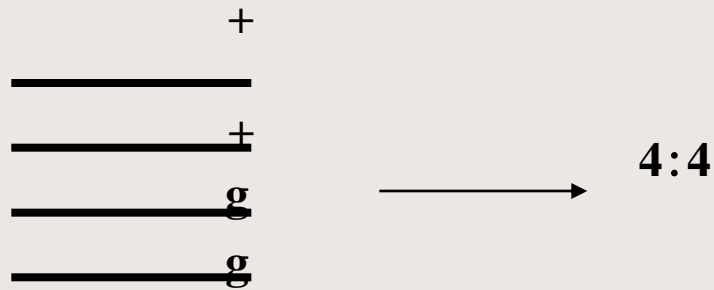
理论上的配子

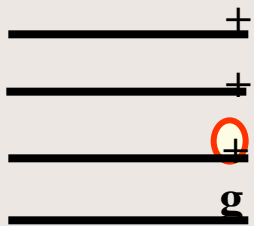
实际配子

★ 例2: 粪生粪壳菌

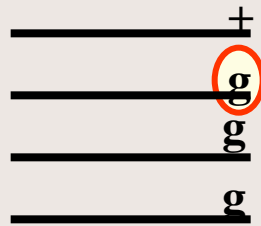
$g^+ \times g^-$

正常型

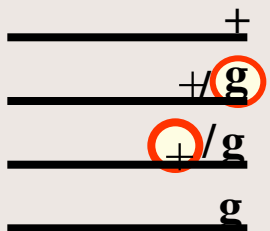




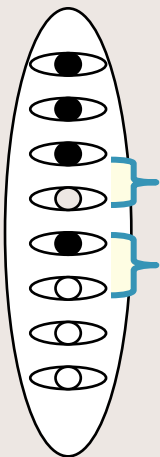
$6g^+ : 2g^-$



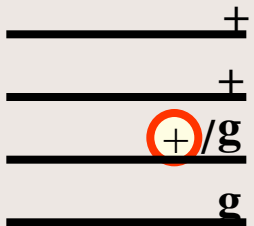
染色单体转变



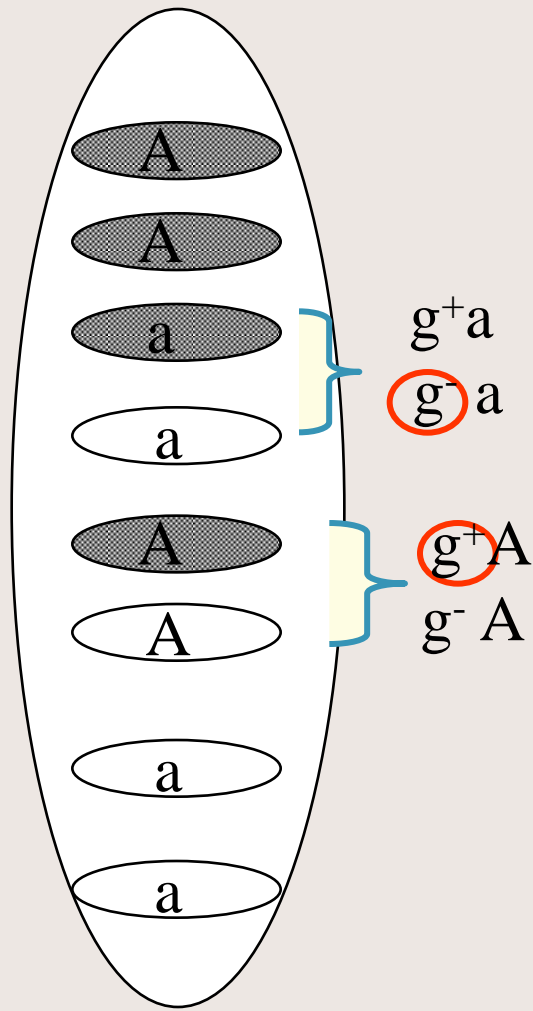
$3g^+$
 $1g^-$
 $1g^+$
 $3g^-$



半染色单体转变



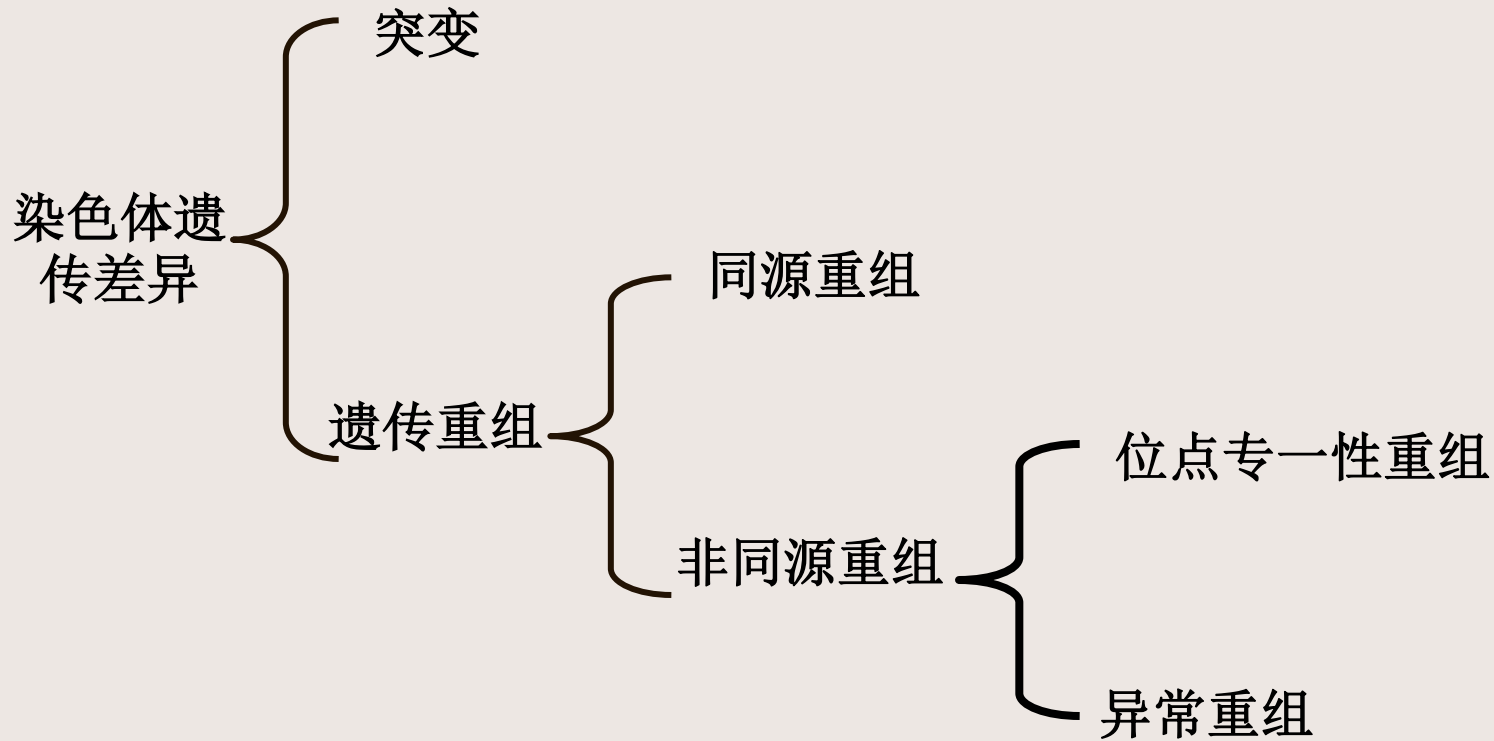
$5g^+ : 3g^-$



基因转变和遗传重组有关

二、遗传重组

重组类型



重组模型

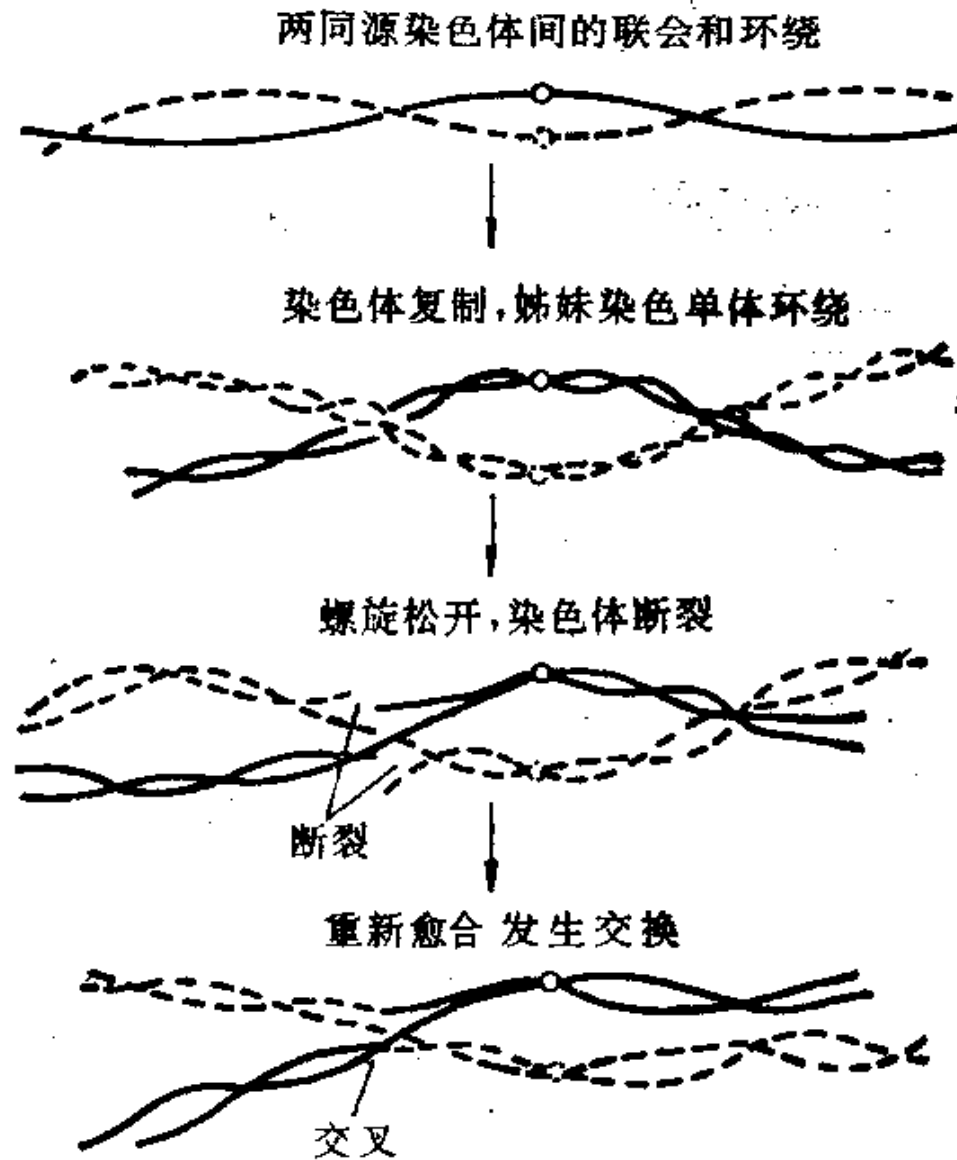


图 12-11 染色体断裂愈合模型示意图。

断裂愈合模型

模写选择模型

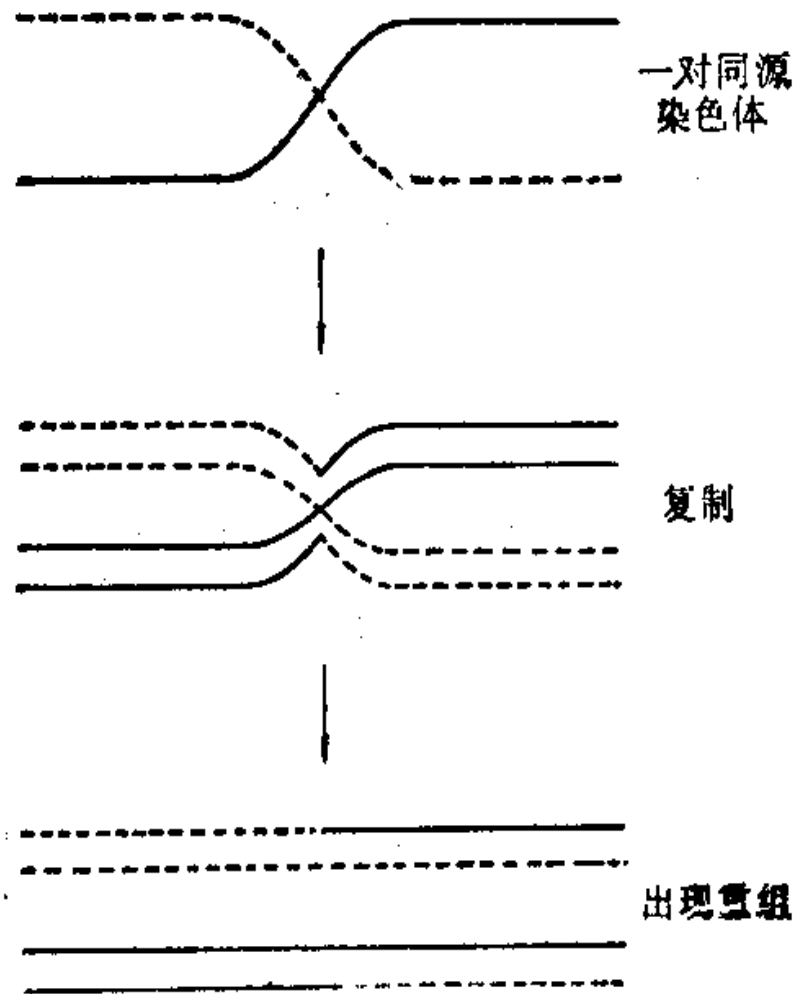


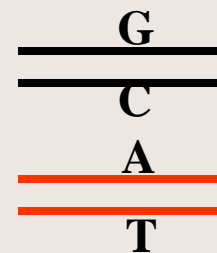
图 12-12 重组的模写选择模型。

同源重组Holliday模型

(异源、杂种DNA模型)

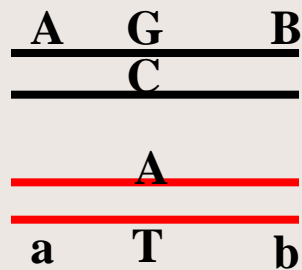


σ^+
 σ^-

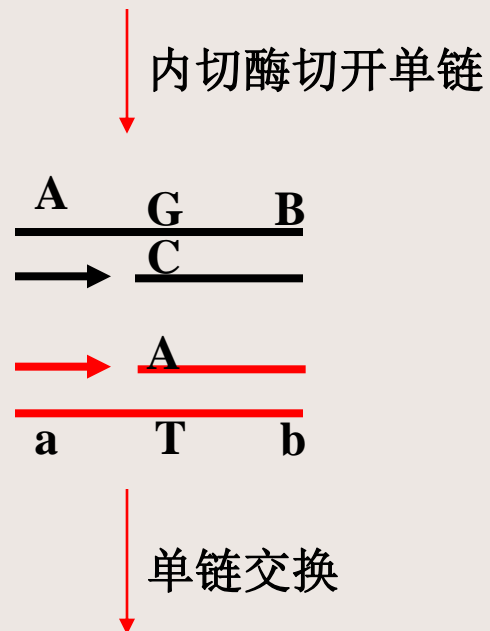


2DNA分子

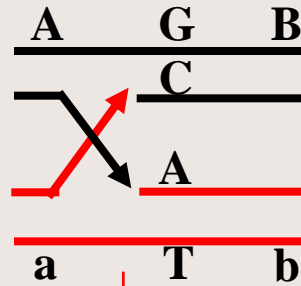
A: 同源的非姊妹染色单体联会



B: 非姊妹染色单体DNA中两个方向相同的单链，在DNA内切酶的作用下，在相同位置同时切开

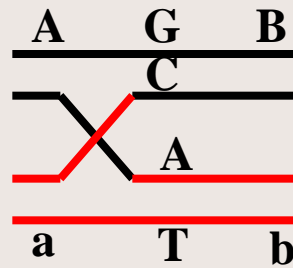


C: 切开的单链交换重接



连接

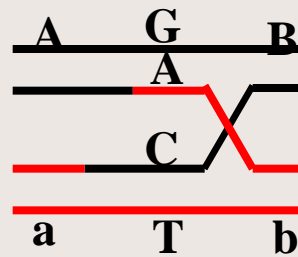
D: 形成交联桥结构



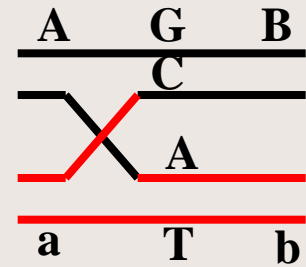
分支迁移

交联桥结构

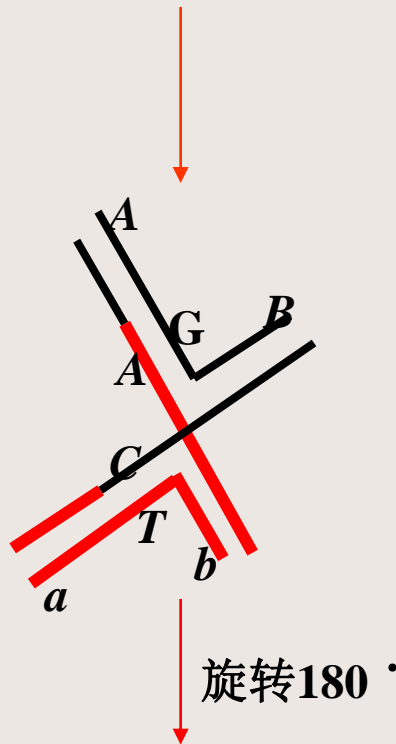
E: 交链桥的位置可以
靠拉练式活动沿着配
对DNA分子移动形成
Holliday结构



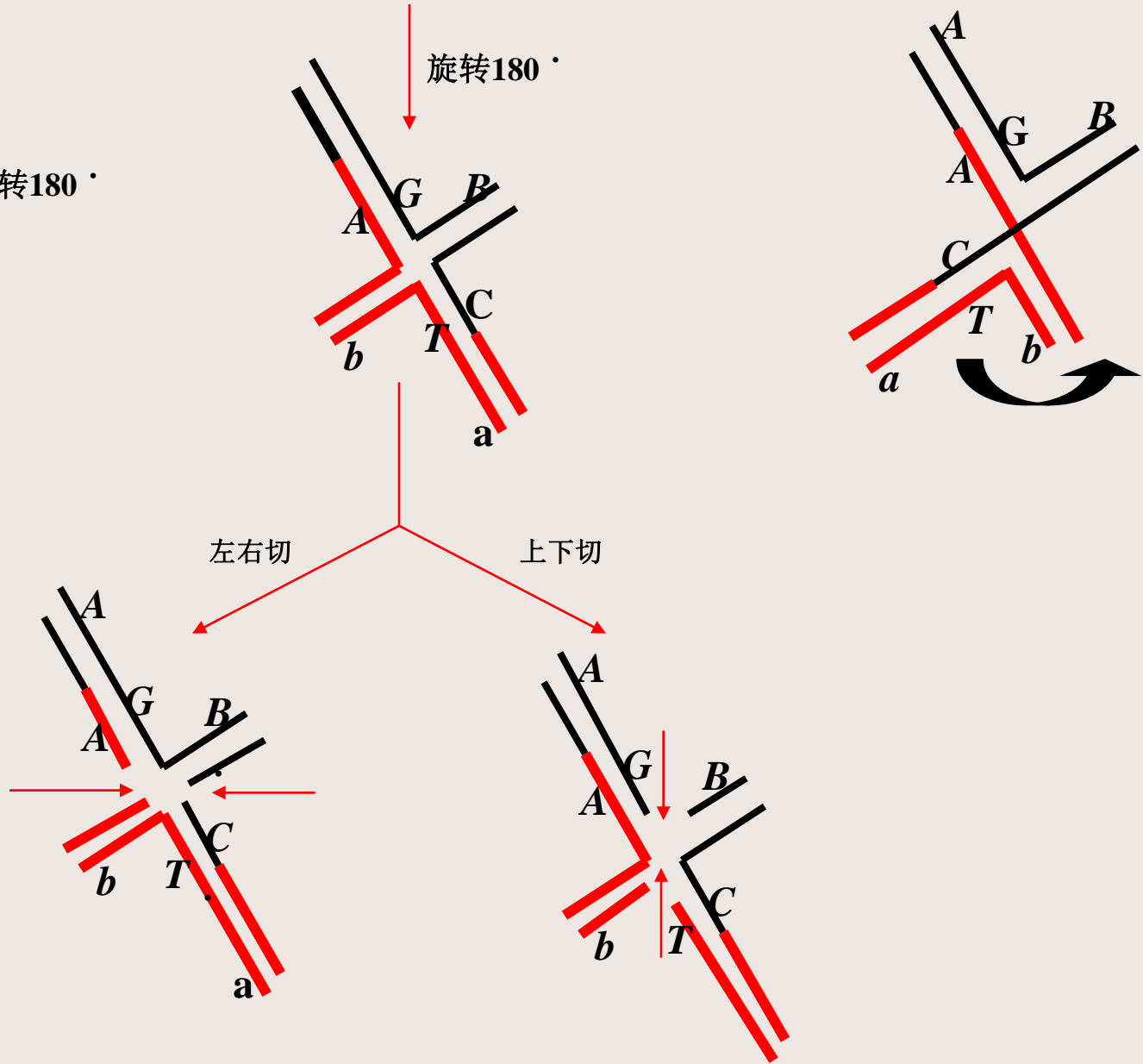
Holliday结构

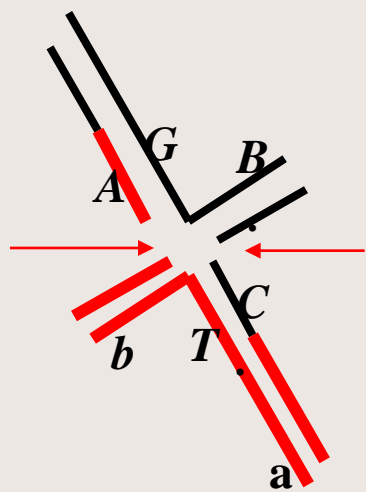


F:

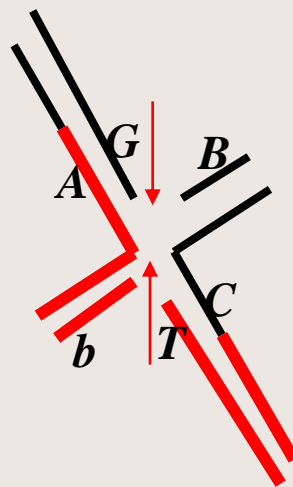
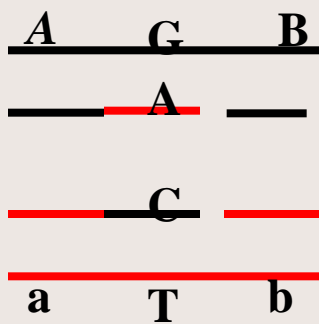


G: 绕交联桥旋转180°

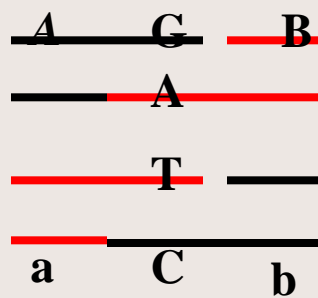




↓ 左、右



↓ 上、下



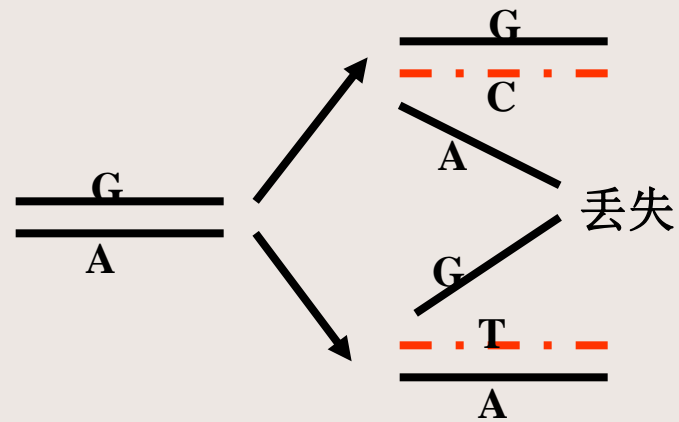
A G B
A
C
a T b

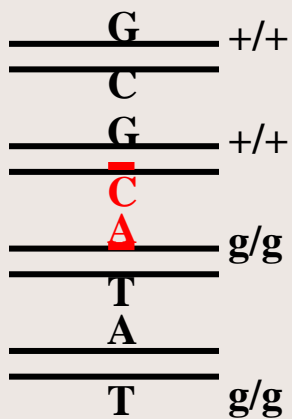
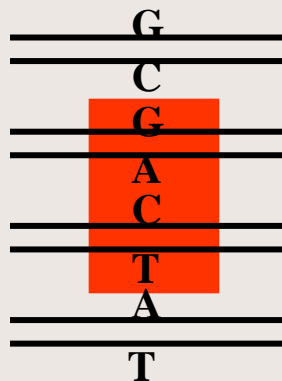
A G b
A
T
a C b

A G B
A
C
a T b

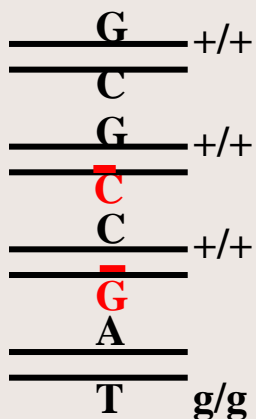
A G b
A
T
a C B

不配对碱基的修复校正

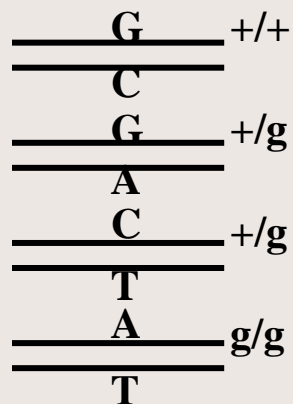




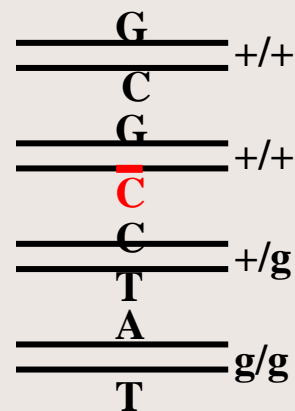
正常校正



两个杂种
分子都校正到+或g
肘



均未校正



一个校正为+,
或为g

- 1、两个杂种分子均未校正3:1:1:3
- 2、一个杂种分子校正为+, 或者校正为g时, 则发生另一种类型的半染色单体的转变, 前者出现5:3, 后者出现3:5。

3、两个杂种分子都校正到+或g时，修复后出现6:2或2:6，为染色单体转变的起因。

4、当两个杂种分子都按原来两个亲本的遗传结构进行修复时，则减数分裂4个产物正常配对，出现4:4。

基因转变的实质是异源双链DNA错配
核苷酸对在修复校正过程中发生的一个
基因转变为他的等位基因现象