

















## Recombinant DNA and Biotechnology Recombinant Proteins

Protein	Use		
Human insulin	Treatment of diabetes		
Human growth hormone	Treatment of some endocrine disorders		
Erythropoietin	Stimulation of red blood cell production		
Colony-stimulating factors	Production and activation of white blood cells		
Coagulation factors IX and X	Treatment of blood-clotting disorders (hemophilia)		
Tissue-type plasminogen activator	Lysis of blood clots after heart attack and stroke		
Bovine growth hormone	Production of milk in cows		
Hepatitis B surface antigen	Vaccination against hepatitis B		
Vaccine proteins: Hepatitis B, herpes, influenza, Lyme disease, meningitis, pertussis, etc	Prevent and treat infectious diseases coronavirus ("RNA")		



Recombinant DI ENZYMES USED IN R DNA TECHNO	NA and Biotechnology RECOMBINANT IOLOGY
enzymology."	Lubert Stryer
1. Restriction enzymes	Restriction endonucleases are used to cut DNA into fragments
2. DNA polymerases	which then are spliced together in new combinations.
3. Polynucleotide kinase	<b>DNA ligase</b> catalyzes the joining of DNA fragments
4. Polynucleotide ligase	
5. Reverse transcriptase	Most of the others are used for specific processes once you have
6. Alkaline phosphatase	your recombinant DNA.
7. S1 nuclease	





TABLE 3-2 Recognition and Cleavage Sites of Some Restriction Enzymes				
Enzyme	Recognition Sequence <sup>a</sup>	Microorganism	5' GGATCC 3'	BamHI
AluI	AG↓CT	Arthrobacter luteus	3' CCTAGG 5'	
BamHI	G↓GATCC	Bacillus amyloliquefaciens H		
BgIII	A↓GATCT	Bacillus globigii	5' GAATTC a	<u>Eco</u> RI
EcoRI	G↓AATTC	Escherichia coli RY13	2 CTTAAC -	
EcoRII	$\downarrow CC(^{A}_{T})GG$	Escherichia coli R245	S CITAAG 5	
EcoRV	GAT↓ATC	Escherichia coli J62 pLG74		
HaeII	RGCGC↓Y	Haemophilus aegyptius	5'GGCC a	HaeIII
HaeIII	GG↓CC	Haemophilus aegyptius	2' CCGG E	
HindIII	A↓AGCTT	Haemophilus influenzae R <sub>d</sub>	5 0005	
HpaII	CICGG	Haemophilus parainfluenzae		
MspI	C‡CGG	Moraxella species	5' GCGC 2'	
PstI	CTGCAIG	Providencia stuartii 164	3' CGCG 5'	Hhal
PvuII	CAG↓CTG	Proteus vulgaris	1	
SalI	G↓TCGAC	Streptomyces albus G	1	
TaqI	T↓CGA	Thermus aquaticus	5' CTCGAG 3'	Xhol
XhoI	C↓TCGAG	Xanthomonas holcicola	CACCTC -	































