RAMA UNIVERSITY

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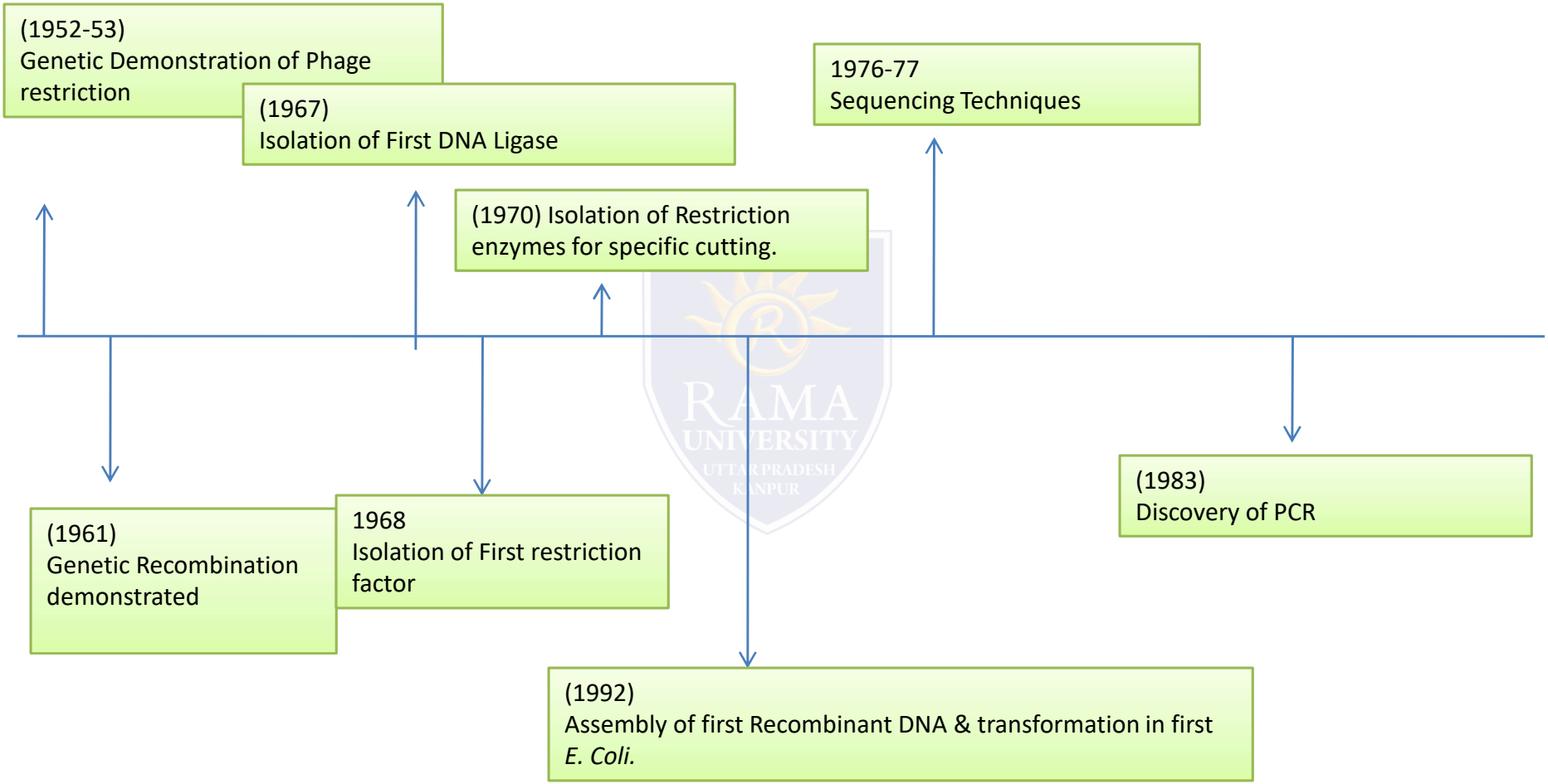
FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

BACTERIAL HOST USED IN GENETIC ENGINEERING

Sr. No.	Heterologous host	Advantages	Disadvantages
1	*E. coli* (Gram-negative)	•Fast growth rate •Extensive genetic tools •Clean chemical background for downstream natural product detection and separation •Comprehensive knowledge of native metabolic networks	•Lacks necessary biosynthetic machinery and precursors •Extensive genetic manipulation may be required for production of actinomycete natural products
2	*P. putida* (Gram-negative)	•Fast growth rate •Well-developed genetic tools •Good adaptability to different physicochemical and nutritional conditions •Good xenobiotics tolerance •High NADPH regeneration rate •Versatile intrinsic metabolism with diverse enzymatic capacities	•Low productivity yield of PKs/NRPs •Lack of advanced expression strategies for large BGCS •Limited knowledge of native metabolic networks
3	*B. subtilis* (Gram-positive)	•Fast growth rate •Thorough genetic characterization •Well-developed recombinant methods •Suitable host for a wide assortment of biologically active small molecules from *Bacillus spp.*	•Lack of autonomous plasmids to facilitate cloning, transfer and heterologous expression of large BGCs
4	*Streptomyces spp.*- (Gram-positive)	•Rich in metabolic precursors and enzymatic mechanisms supporting most biosynthetic pathways •Versatile intrinsic metabolism supporting unique posttranslational modifications required for PKS and NRPS function •Suitable for expression of most proteins from actinomycetes	•Slow growth rate •Lack of genetic parts and advanced genetic manipulation tools •Endogenous competing BGCs

HISTORY OF MOLECULAR CLONING



TRADITIONAL CLONING

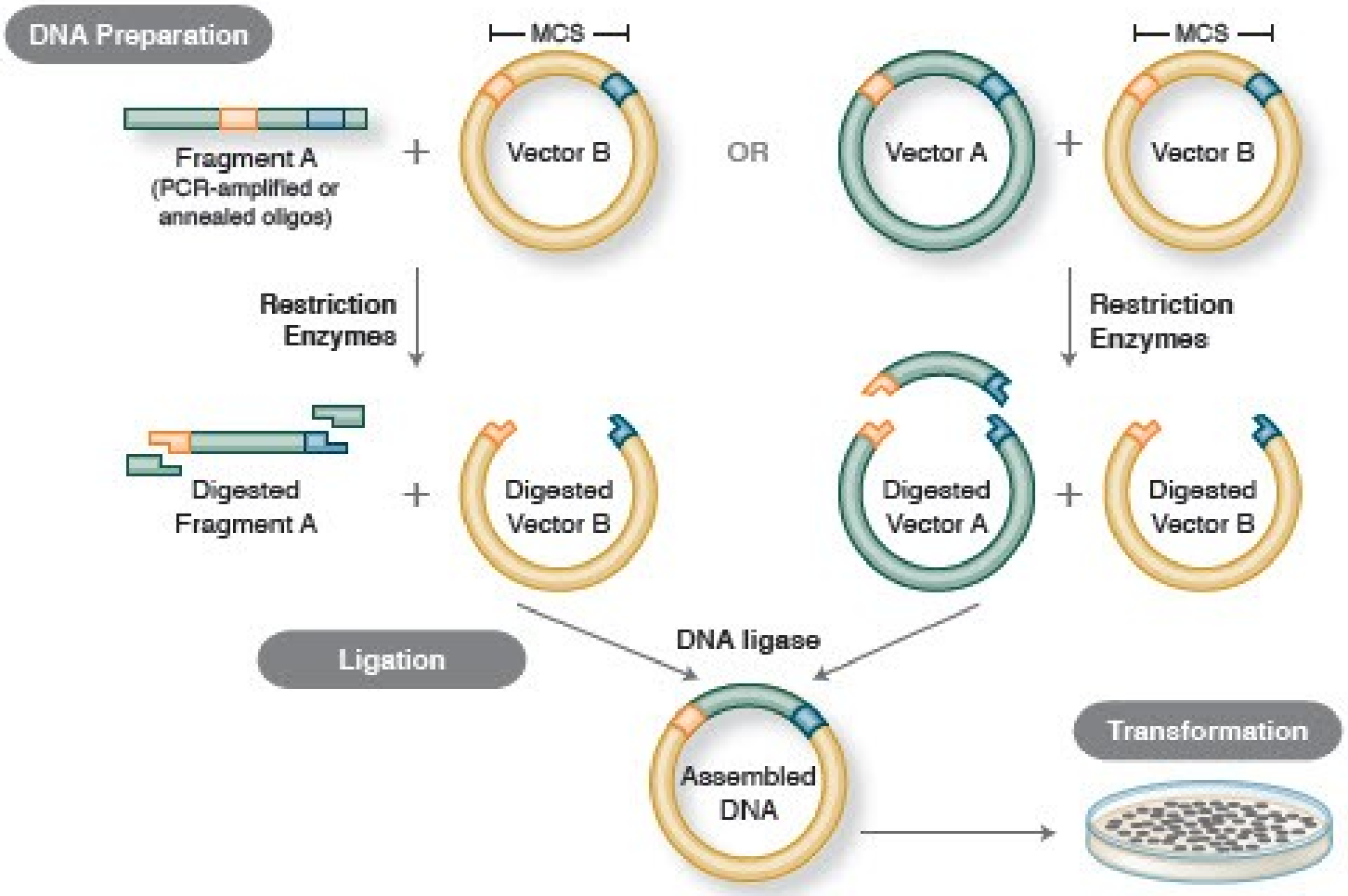


Image taken from the website of New England Biolabs