FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

Molecular Biology *of Escherichia coli*

***Escherichia coli* plasmids**

Name	Type of element	Characteristics
ColE1	Replication origin	Generates 15–20 copies of each plasmid molecule. Colicin production. Related to plasmids that confer immunity to phage infections
p15A	Replication origin	Low copy number replication origin, estimated in 18–22 copies per cell and found in pACYC and its derivative vectors.
pMB1	Replication origin	Versatile replication origin. The original sequence generates 15–20 copies per cell, but a mutant version can lead up to 700 copies per cell and contains the *Eco*RI restriction-modification system.
pSC101	Replication origin	Five copies per cell .
R6K	Replication origin	15–20 copies per cell. Requires the π protein from the gene *pir* for replication.
Amp^r, Kan^r, Cm^r, Tet^r among other	Selection markers	Elements required for the selection and maintenance of plasmids in bacterial hosts. For additional markers, RAC database contains the information regarding antibiotic resistance traits and their sequence or iGEM website for sequence modules bearing the proper syntax for synthetic constructs
LacZ, CcdB, Green Fluorescent protein (GFP), etc	Additional elements required for positive clone selection, reporter protein fusions among others	Plasmids have been modified so that they contain multiple cloning sites with diverse unique restriction sites, counter selection for positive clone selection.

Informations taken from the chapter Vargas-Maya Naurú Idalia and Franco Bernardo

Molecular Biology of Bacteriophage

Genes/elements Identified in Lactococcal Phages

Phage	*Gene/element*	*Function*	*Reference*
øvML3	lysin	lysin	Shearman *et al.* (1989); Shearman *et al.* (1994)
BK5-t	*bpi*	regulation of gene expression	Lakshmidevi *et al.* (1990)
	pa1, pf2, pa3, pg2, pf1	phage promoter sequences	Lakshimidevi *et al.* (1990)
	imm	possible repressor	Boyce *et al.* (1993)
ø50	*per50*	origin of replication	Hill *et al.* (1990a)
	LlaI	methylase	Hill *et al.* (1991b)
ø197	*poa17, por14, poa79*	phage DNA fragments encoding (portions) of structural proteins	Schouler *et al.* (1992)
øLC3	*cos*	packaging	Lillehaug *et al.* (1991)
	int, attP/attB	integrase and attachment site,	Lillehaug & Birkeland (1993)
	lysA, lysB	lysin and holin	Birkeland (1994)
F4-1	*mcp, p35, p43*	structural proteins	Chung *et al.* (1991); Kim & Batt (1991a)
ø7-9	*orf1356*	possible regulator	Kim & Batt (1991b)
øUS3	*lytA, orf66*	lysin and holin	Platteeuw & de Vos (1992)
P001	*lysin*	lysin	Geis (1992)
c2	completely sequenced;	lysin, holin structural proteins,	Ward *et al.* (1993); Lubbers *et al.* (1994);
	39 ORFs identified	cos-site, recombinanse function, helix-turn-helix protein, possible sigma factor, possible terminase binding site	Jarvis *et al.* (1995); M. W. Lubbers, T. P. J. Beresford, A. W. Jarvis, pers. comm.
ø31	*per31*	origin of replication	O'Sullivan *et al.* (1993)
TP9001	*attB*	attachment site; integrase cloned	Christiansen *et al.* (1994)
øsk1	*cos*	packaging	Chandry *et al.* (1994b)
Tuc2009	completely sequenced;	lysin, holin, structural proteins,	Arendt *et al.* (1994); Van de Guchte *et al.* (1994a);
	57ORFs identified	integrase, attachment site, putative repressor, pac-site, dUTPase, proteins involved in replication	Van de Guchte *et al.* (1994b); D. van Sinderen, M. Creaven, C. Daly, M. van de Guchte, E.K. Arendt & G. F. Fitzgerald, unpublished results

Information taken from the Garvey, et. al 1995.