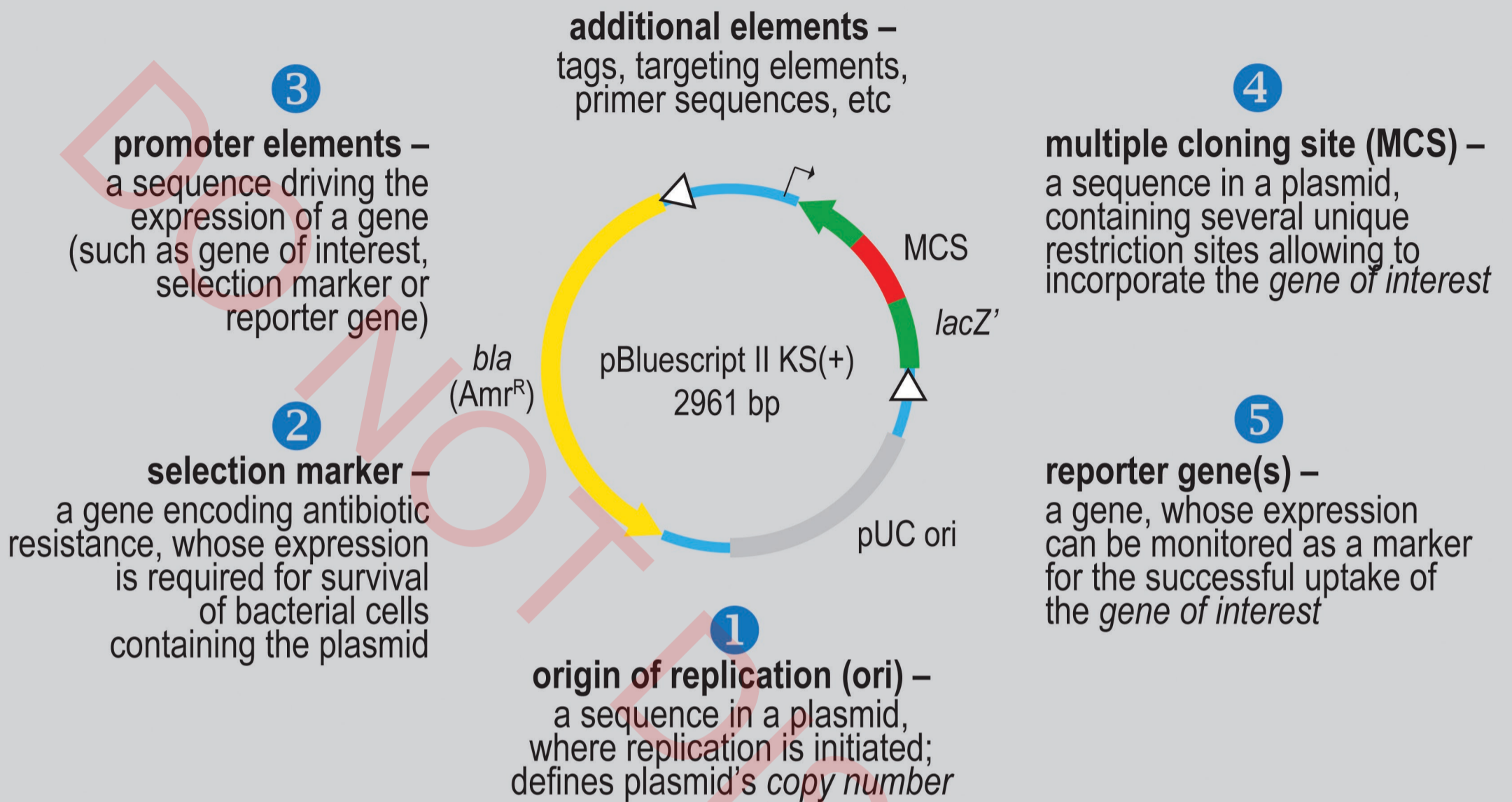


# Anatomy of a plasmid

Plasmids are autonomously replicating pieces of extrachromosomal DNA.

Plasmids are **vectors** – DNA molecules, used to transfer foreign genetic material into another cell



## 1 Origin of replication

vector	copy number	ori
pBR322	15-20	pMB1
pUC	500-700	pMB1'
pET	15-20	pBR322
pBluescript	300-500	ColE1' / f1

## 2 Antibiotic resistance

antibiotic	class	selection marker
ampicillin	bactericidal	$\beta$ -lactamase ( <i>bla</i> )
carbenicillin	bactericidal	$\beta$ -lactamase ( <i>bla</i> )
kanamycin	bactericidal	neomycin phosphotransferase ( <i>neo</i> )
chloramphenicol	bacteriostatic	chloramphenicol acetyltransferase ( <i>cat</i> )

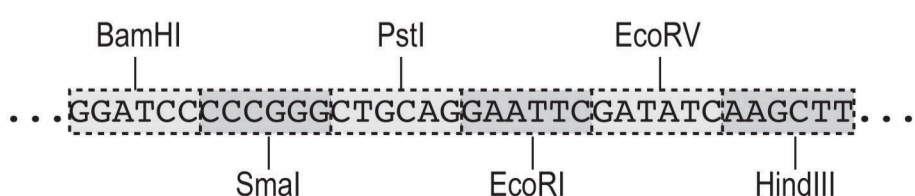
## 3 Promoter elements

PROKARYOTIC		
promoter	purpose	regulation
T7	general expression	constitutive, requires T7 RNA polymerase
T7lac	protein overexpression	tightly regulated by lac operator. Inducible by IPTG
lac	general expression	constitutive without lac repressor ( <i>lacI</i> or <i>lacIq</i> ). Inducible by IPTG or lactose
trp	protein overexpression	repressible by tryptophan

EUKARYOTIC		
promoter	purpose	regulation
CMV	mammalian expression	strong, constitutive
EF1a	mammalian expression	constitutive, cell type-independent
Ubc	mammalian expression	ubiquitous, constitutive
TRE	mammalian expression	inducible by tetracycline
UAS*	<i>Drosophila</i> expression	requires <i>Gal4</i> expression
polyhedrin	baculovirus/insect cells expression	strong, constitutive
ADH1	yeast expression	strong; inhibited by ethanol

\* an enhancer element

## 4 Multiple cloning site ("polylinker")



## 5 Reporter genes

