

## Abbreviations

AA	amino acid
7-ACA	7-aminocephalosporanic acid
7-ADCA	7aminodesacetoxycephalosporanic acid
ADO	assembly of designed oligonucleotides
6-APA	6-aminopenicillanic acid
bps	base pairs
CLERY	combinatorial libraries enhanced by recombination in yeast
CPC	Cephalosporin C
DHR	degenerate homoduplex gene family recombination
DNA	deoxyribonucleic acid
DOGS	degenerate oligonucleotide gene shuffling
dNTP	2'-deoxyribonucleotide triphosphate
epPCR	error-prone PCR
ET recombination	recombination using recE and recT
HTS	high throughput screening
ITCHY	incremental truncation for the creation of hybrid enzymes
MAX	maximum efficiency randomisation
NF	mutant library of N266X combined with F375X
PenG	Penicillin G
PCR	polymerase chain reaction
RACHITT	random chimeragenesis on transient templates
RE	restriction enzyme
RETT	recombined extension on truncated templates
RID	random insertion/deletion
RPR	random-priming <i>in vitro</i> recombination
SCOPE	structure-based combinatorial protein engineering
SCRATCHY	shuffling combined with ITCHY
SHIPREC	sequence-homology-independent protein recombination
SISDC	sequence-independent site-directed chimeragenesis.
sp	spacer peptide
ss	signal sequence
ssDNA	single stranded DNA
StEP	staggered extension process
THIO-ITCHY	ITCHY with $\alpha$ -phosphothioate deoxynucleotide triphosphates
YLBS	Y-ligation-based block shuffling
YNF	mutant library of Y178H combined with N266X and F375X