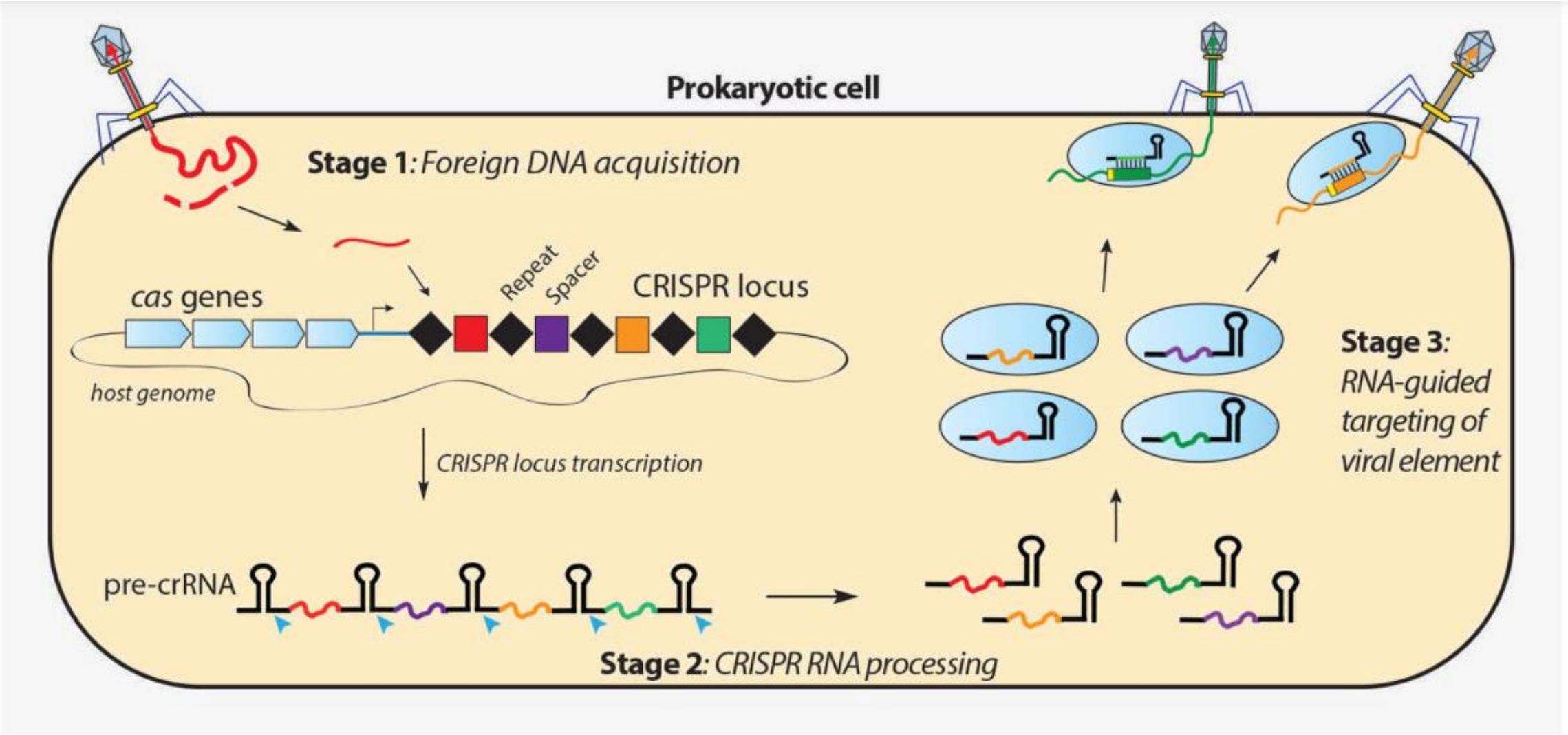


CRISPR – **C**lustered **R**egularly **I**nterspaced **S**hort **P**alindromic **R**epeats

Could you have discovered CRISPR?

GGAGTTCTACCGCAGAGGCGGGGGAACTCCAAGTGATA
TCCATCATCGCATCCAGTGCGCCCGGTTTATCCCCGCT
GATGCGGGGAACACCAGCGTCAGGCGTGAAATCTCACC
GTCGTTGCCGGTTTATCCCTGCTGGCGCGGGGAACTCT
CGGTTCAGGCGTTGCAAACCTGGCTACCGGGCGGTTTA
TCCCCGCTAACGCGGGGAACTCGTAGTCCATCATTCCA
CCTATGTCTGAACTCCCGGTTTATCCCCGCTGGCGCGG
GGAACTCG

Could you have discovered CRISPR?

GGAGTTCTACCGCAGAGGCGGGGGAACTCCAAGTGATATCCATCATCGCATCCAGTGCGCCCGGTTTAT
CCCCGCTGATGCGGGGAACACCAGCGTCAGGCGTGAAATCTCACCGTCGTTGCCGGTTTATCCCTGCTG
GCGCGGGGAACTCTCGGTTCAGGCGTTGCAAACCTGGCTACCGGGCGGTTTATCCCCGCTAACGCGGGG
AACTCGTAGTCCATCATTCCACCTATGTCTGAACTCCCGGTTTATCCCCGCTGGCGCGGGGAACTCG

GGAGTTCTACCGCAGAGGCGGGGGAACTCCAAGTGATATCCATCATCGCATCCAGTGCGCC
CGGTTTATCCCCGCTGATGCGGGGAACACCAGCGTCAGGCGTGAAATCTCACCGTCGTTGC
CGGTTTATCCCTGCTGGCGCGGGGAACTCTCGGTTCAGGCGTTGCAAACCTGGCTACCGGG
CGGTTTATCCCCGCTAACGCGGGGAACTCGTAGTCCATCATTCCACCTATGTCTGAACTCC
CGGTTTATCCCCGCTGGCGCGGGGAACTCG

29 nucleotide
“short palindromic repeat”

32 nucleotide
“interspersed spacer”

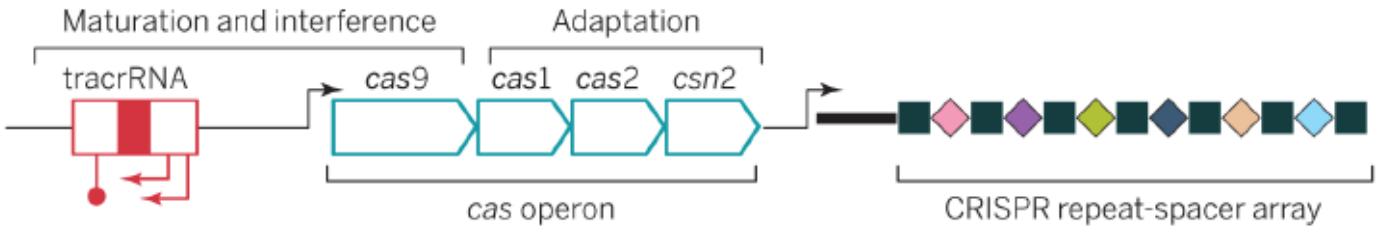
Could you have discovered CRISPR?

GGAGTTCTACCGCAGAGGCGGGGGAACTCCAAGTGATATCCATCATCGCATCCAGTGCGCCCGGTTTAT
CCCCGCTGATGCGGGGAACACCAGCGTCAGGCGTGAAATCTCACCGTCGTTGCCGGTTTATCCCTGCTG
GCGCGGGGAACTCTCGGTTCAGGCGTTGCAAACCTGGCTACCGGGCGGTTTATCCCCGCTAACGCGGGG
AACTCGTAGTCCATCATTCCACCTATGTCTGAACTCCCGGTTTATCCCCGCTGGCGCGGGGAACTCG

GGAGTTCTACCGCAGAGGCGGGGGAACTCCAAGTGATATCCATCATCGCATCCAGTGCGCC
CGGTTTATCCCCGCTGATGCGGGGAACACCAGCGTCAGGCGTGAAATCTCACCGTCGTTGC
CGGTTTATCCCTGCTGGCGCGGGGAACTCTCGGTTCAGGCGTTGCAAACCTGGCTACCGGG
CGGTTTATCCCCGCTAACGCGGGGAACTCGTAGTCCATCATTCCACCTATGTCTGAACTCC
CGGTTTATCCCCGCTGGCGCGGGGAACTCG

29 nucleotide
"short palindromic repeat"

32 nucleotide
"interspersed spacer"



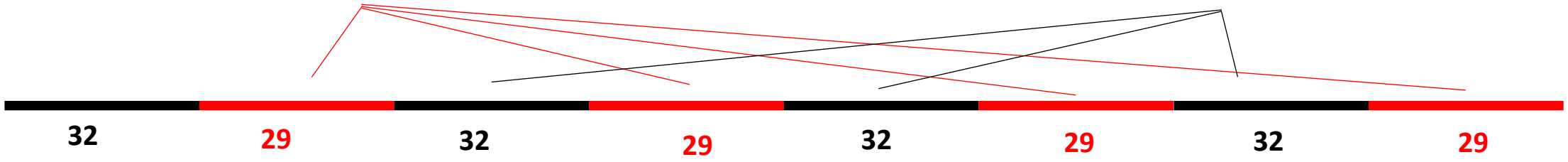
GGAGTTCTACCGCAGAGGCGGGGGAACTCCAAGTGATATCCATCATCGCATCCAGTGCGCC
CGGTTTATCCCCGCTGATGCGGGGAACACCAGCGTCAGGCGTGAAATCTCACCGTCGTTGC
CGGTTTATCCCTGCTGGCGCGGGGAACTCTCGGTTCAGGCGTTGCAAACCTGGCTACCGGG
CGGTTTATCCCCGCTAACGCGGGGAACTCGTAGTCCATCATTCCACCTATGTCTGAACTCC
CGGTTTATCCCCGCTGGCGCGGGGAACTCG

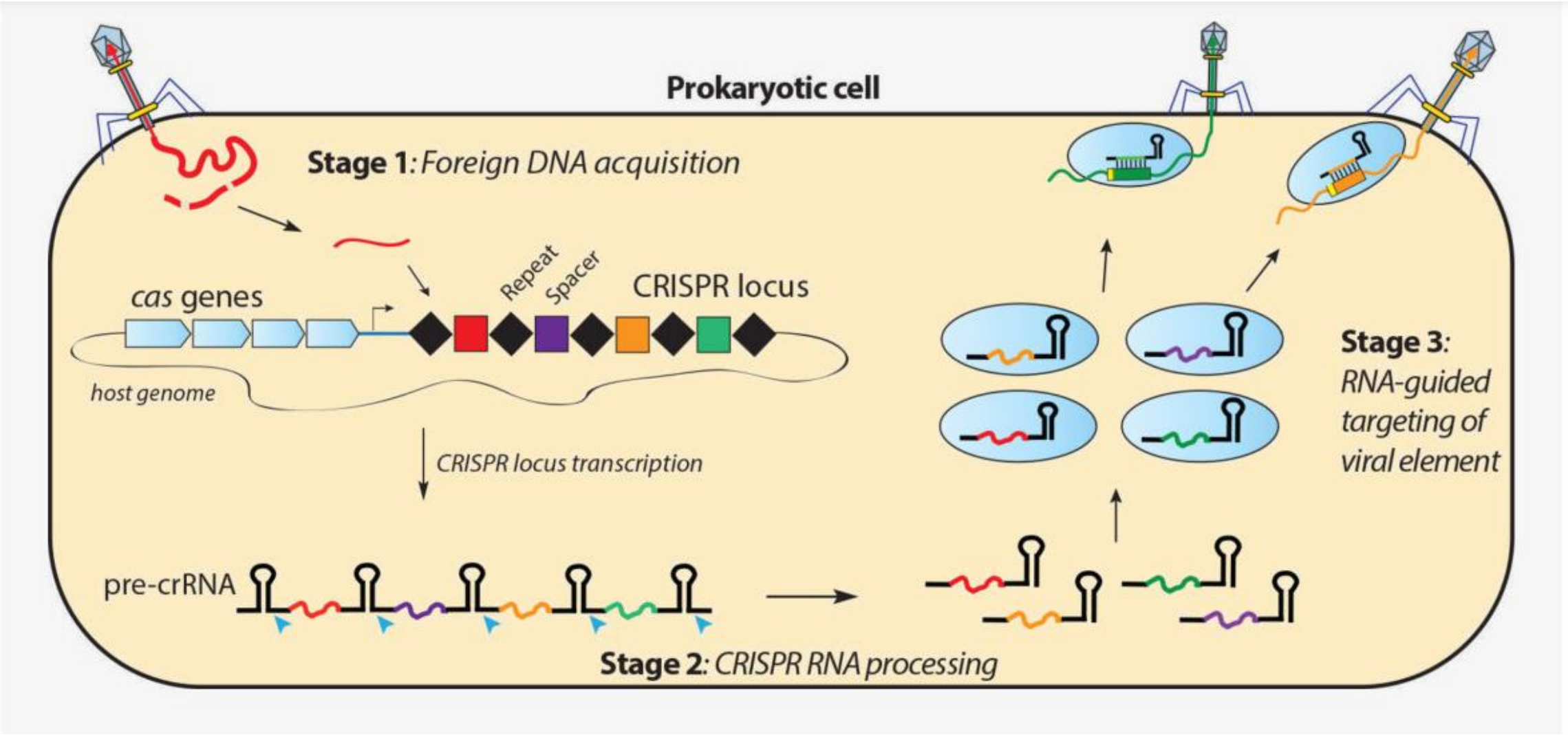
CRISPR repeats (29)

Clustered Regularly Interspersed Palindromic Repeats

Spacer sequences (32)

(later shown to be foreign DNA)

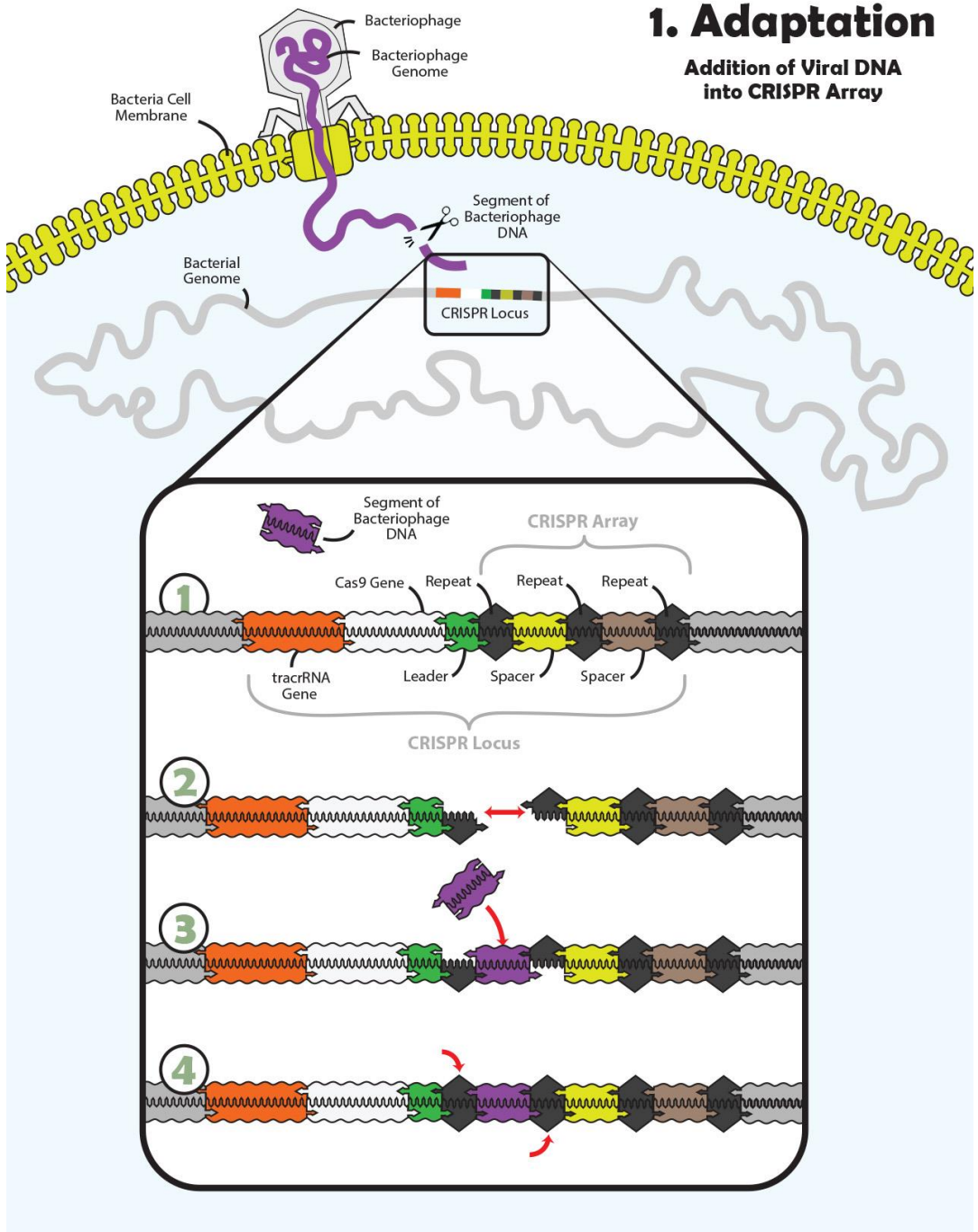




CRISPR – **C**lustered **R**egularly **I**nterspaced **S**hort **P**alindromic **R**epeats

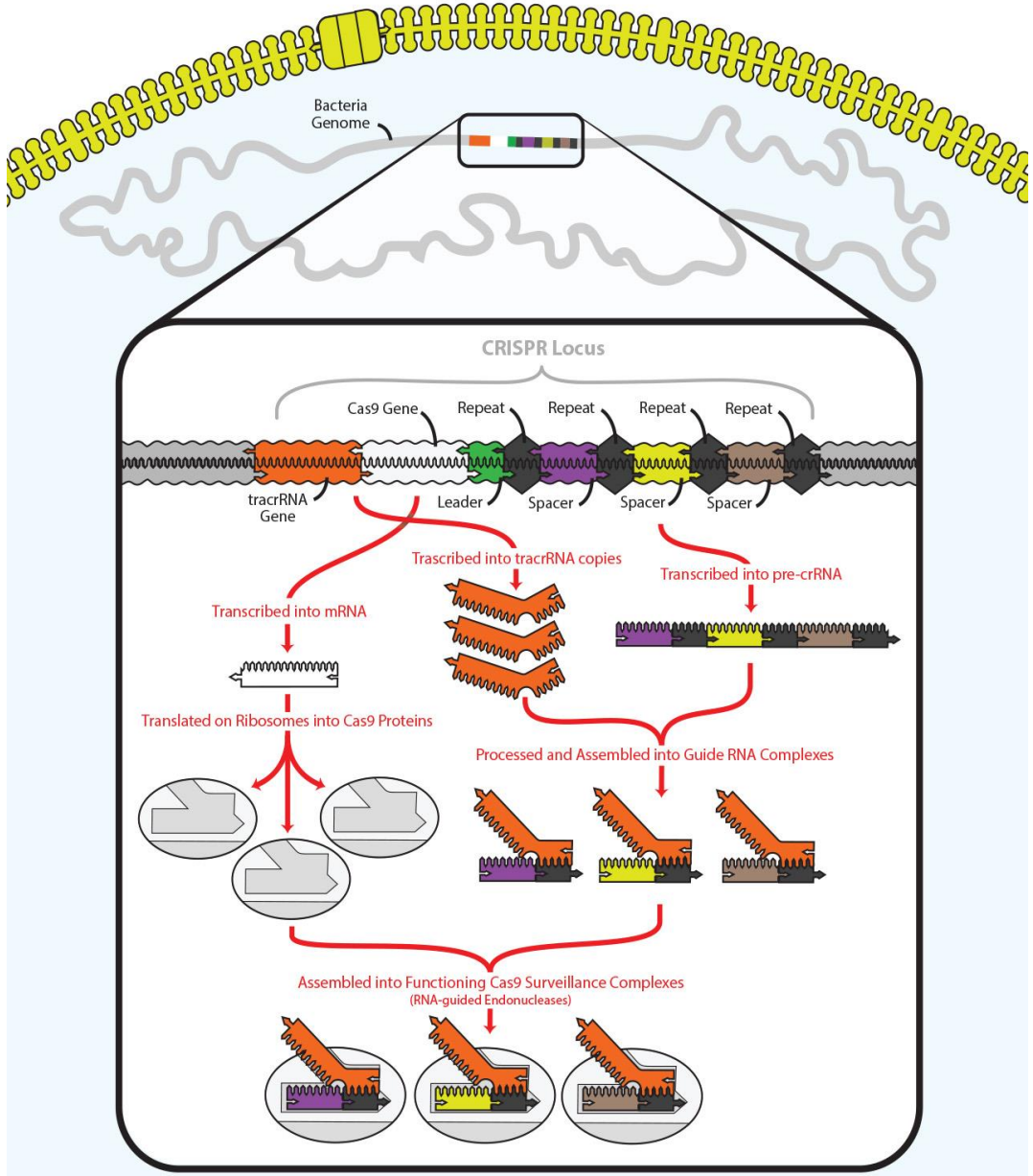
1. Adaptation

Addition of Viral DNA into CRISPR Array



2. Expression of CRISPR Locus Genes

Building Cas9 Surveillance Complexes



3. Invader Silencing

Cutting the DNA of an Incoming Virus