

BASIC DNA assembly

Biopart Assembly Standard for Idempotent Cloning

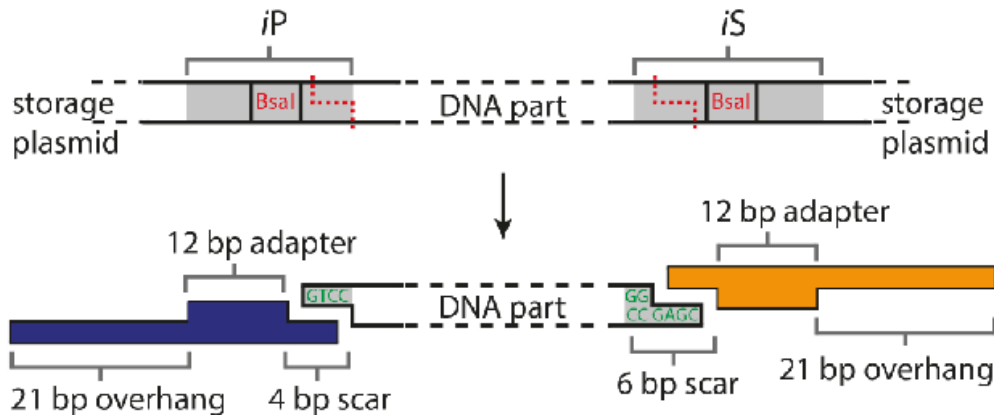
Fast, accurate and modular DNA assembly method
for synthetic biology and general molecular biology applications

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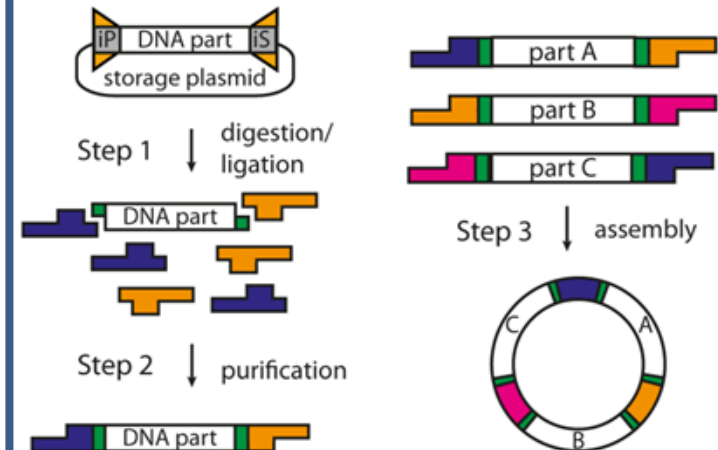
Baldwin Lab, Imperial College London

Parts in BASIC format are released and linkers ligated



- Parts are released from vector by Bsal digestion
- Oligonucleotide linkers are simultaneously ligated onto each specific end

Simple 3 step protocol

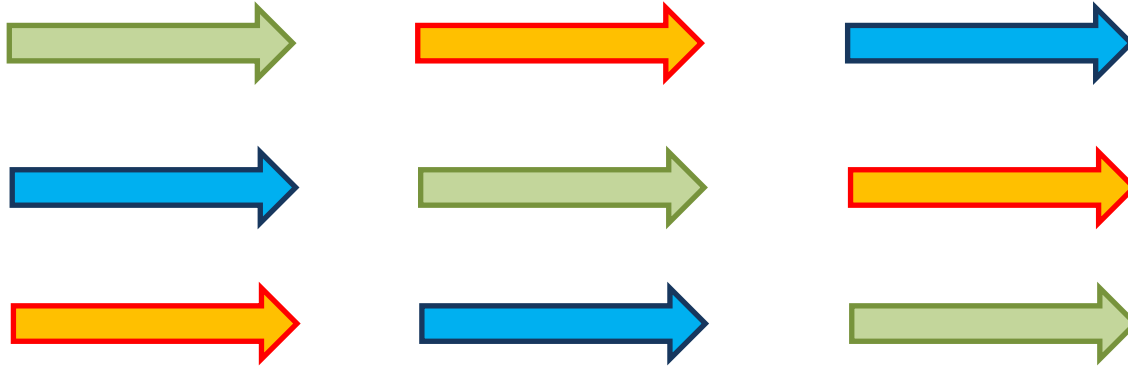


Purified parts are assembled by annealing at 50°C (no ligase!)

Combinatorial pathway assembly

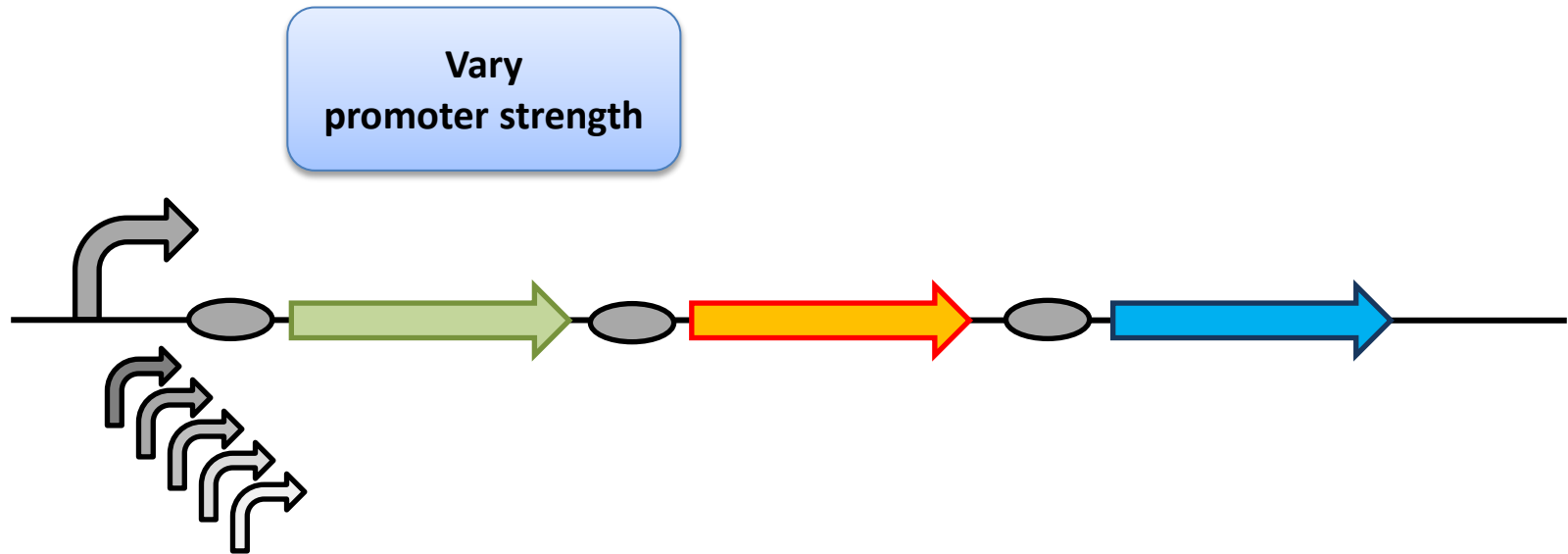
Combining parts in different order

Combine
genes in any
order



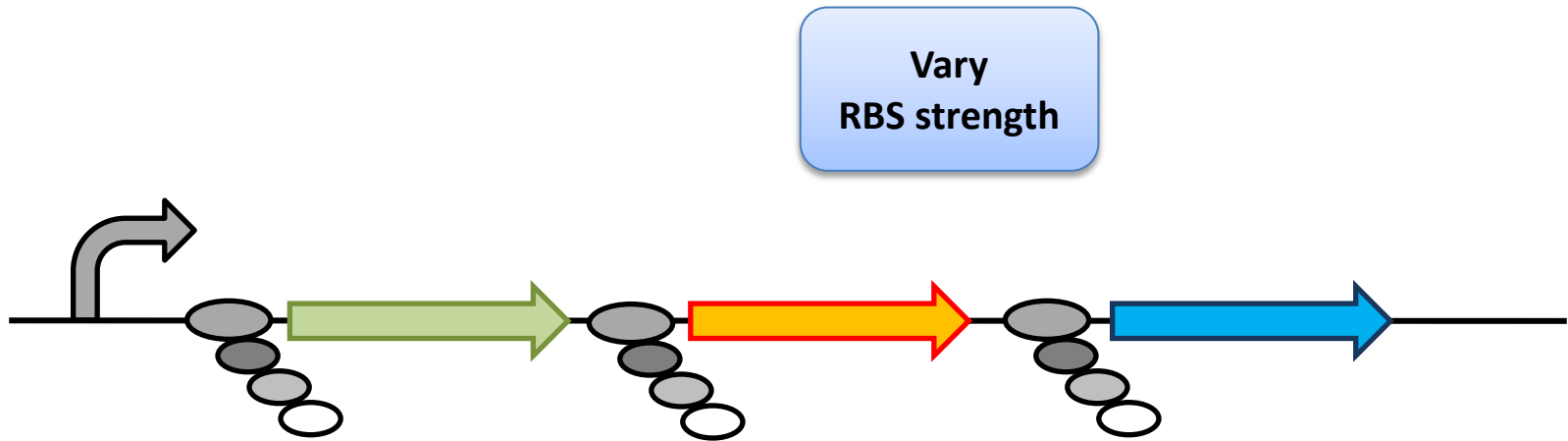
Combinatorial pathway assembly

Driving operon with different promoters



Combinatorial pathway assembly

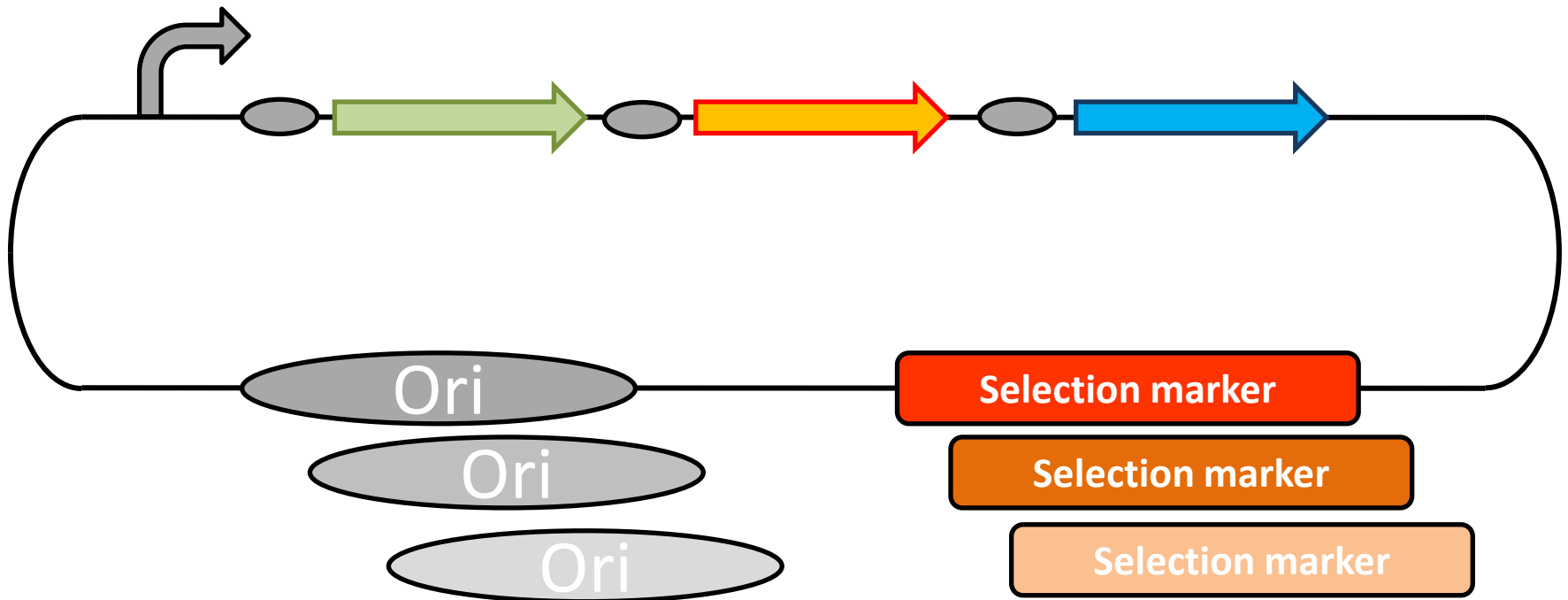
Balancing gene expression via RBS tuning



Combinatorial pathway assembly

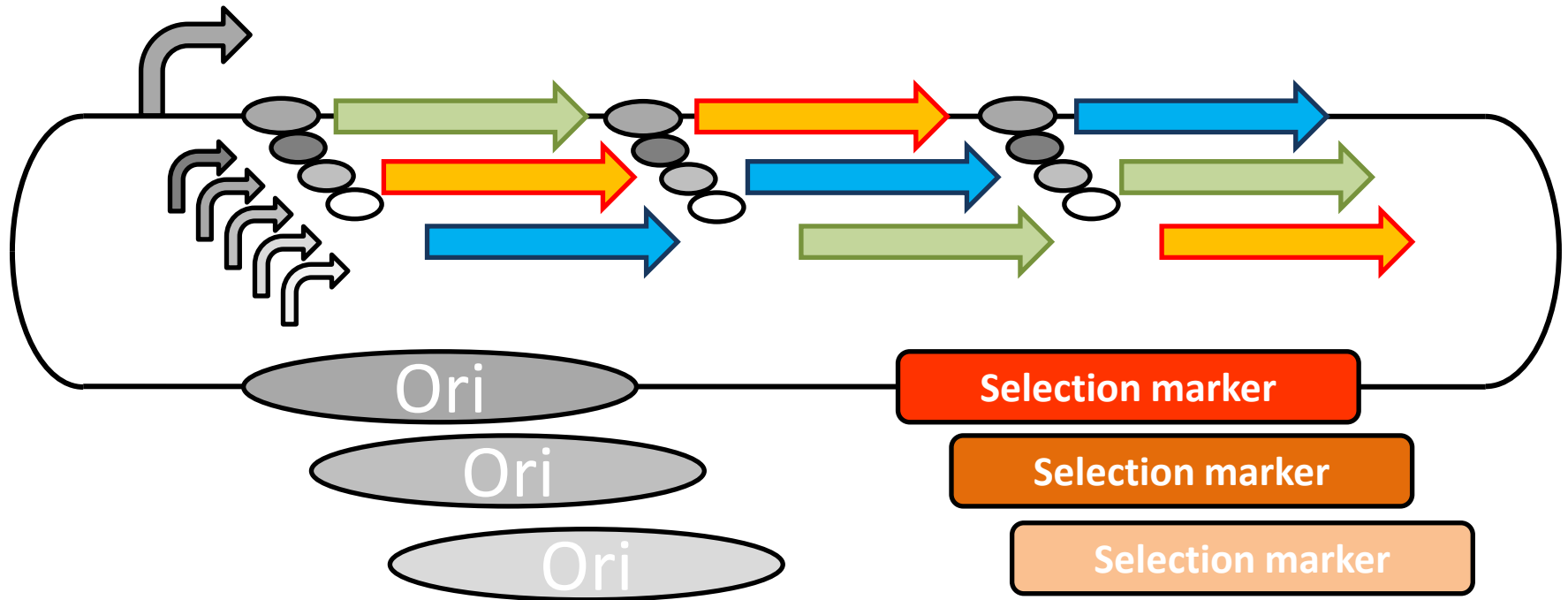
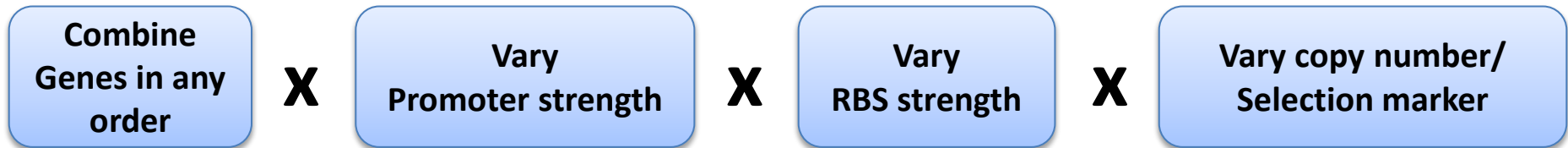
Adjusting copy number and selection marker

Vary copy number/
selection marker



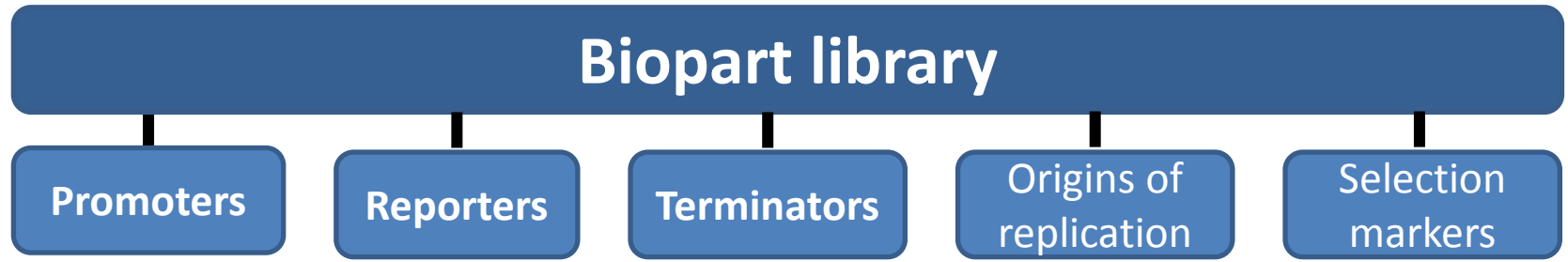
Combinatorial pathway assembly

Combinations quickly add up to large libraries



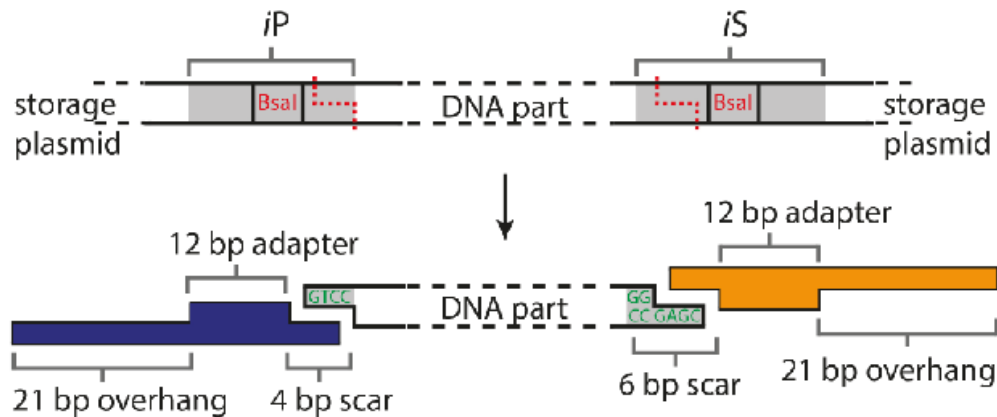
= 7290 plasmids

BASIC standard format and parts library



integrated Prefix
integrated Suffix

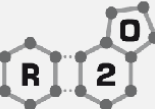
$5' - \text{TCT GGT GGG TCT CTG TCC} \text{ -- DNA -- } \text{GGC TCG GGA GAC CTA TCG} - 3'$
 $3' - \text{AGA CCA CCC AGA GAC AGG} \text{ -- PART -- } \text{CCG AGC CCT CTG GAT AGC} - 5'$
 Ser Gly Gly Ser Leu Ser Gly Ser Gly Asp Leu Ser



BASIC linkers are optimized using bioinformatics

<http://www.r2odna.com>

Create Sequences



1. Design biologically neutral orthogonal DNA spacer sequences.

Submission details

E-mail address:

Project name (optional):

Sequence specifications Reverse mode [?](#)

Enter sequence format:

Number of linkers required: Position: Length:
(allowable range: 10-200 bp)

Melting temperature/GC-content settings:

Tm: applied to whole sequence (Tm range: 40 - 90)

GC%: applied to whole sequence (GC range: 30 - 70)

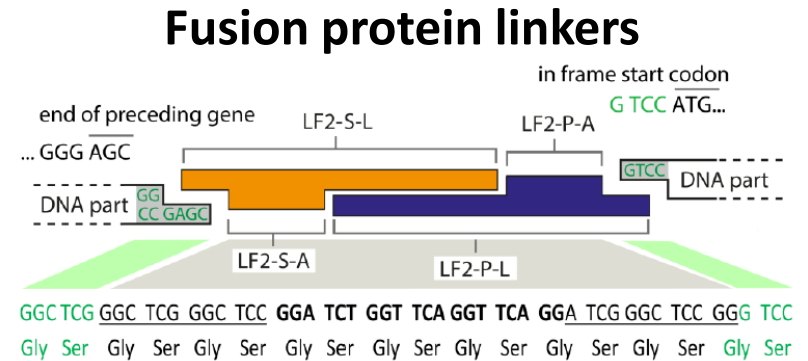
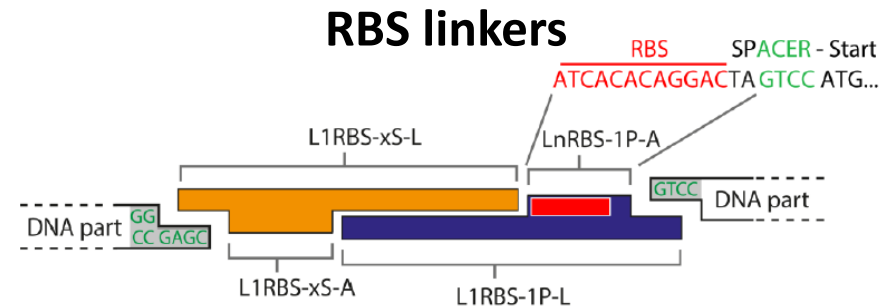
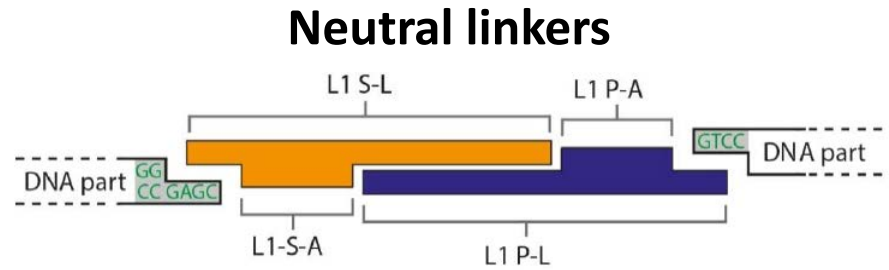
Specify ranges (inclusive and indexed from 0):

Start	End	Option	Value	
<input type="text"/>	<input type="text"/>	<input type="text" value="GC"/>	<input type="text"/>	Add
			<small>(GC range: 30 - 70)</small>	
			<small>(Tm range: 40 - 90)</small>	

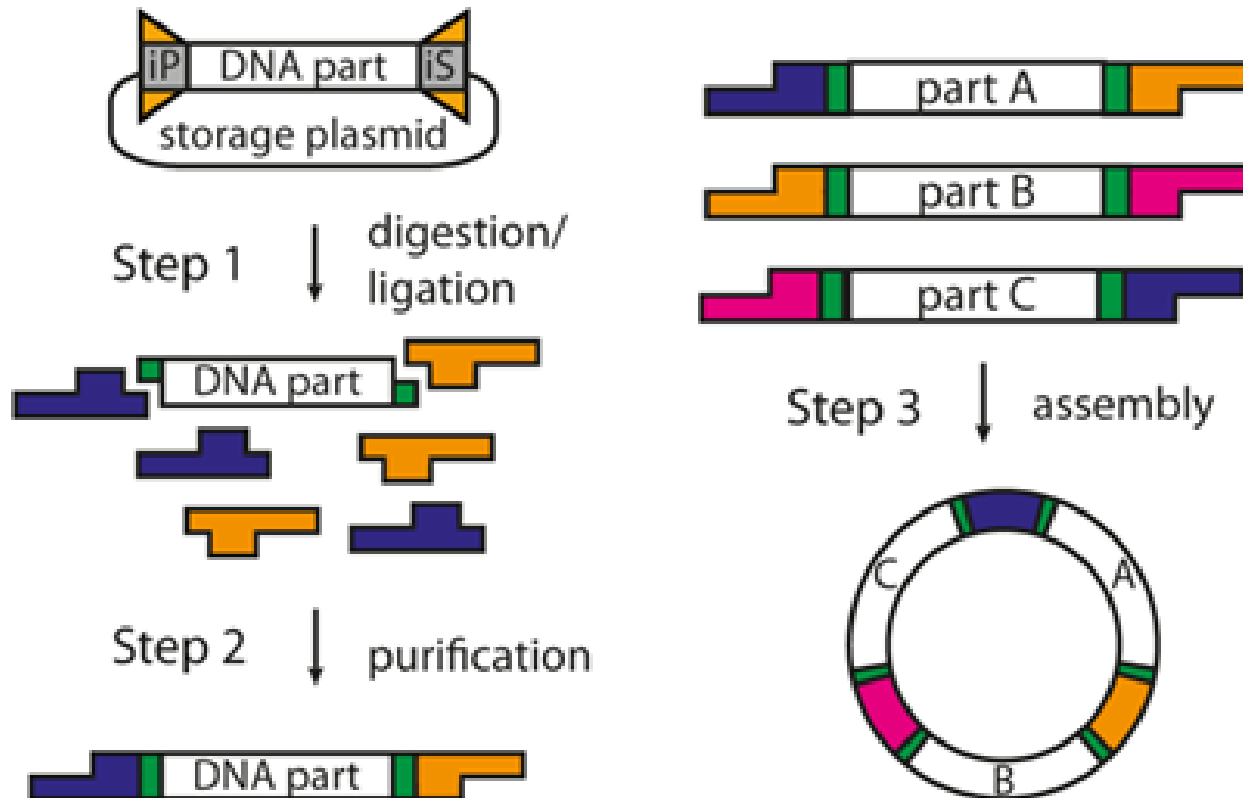
GC/Tm	Start	End	Value	

[Delete](#)

[Customize Settings...](#)



BASIC DNA assembly method is simple, robust and can be automated



**Per assembly stage:
7 part assembly with 90% accuracy**

BASIC DNA assembly summary

- **BASIC allows simple and accurate multipart DNA assembly**
- **Assembled parts can be treated as single part in next stage**
- **A single BASIC part standard facilitates re-use of parts**
- **Basic parts and libraries can be shared easily**
- **BASIC can be completely streamlined**
- **BASIC can be automated start to end**
- **BASIC allows simple promoter and RBS tuning**
- **BASIC covers all prokaryotic construct designs**
- **BASIC supports defined and random library strategies**