

**VERSION 2** OCT 09, 2023

# OPEN ACCESS



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Protocol status: Working We use this protocol and it's working

Created: Oct 08, 2023

### Golden Gate Assembly V.2

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#### **NUS IGEM**

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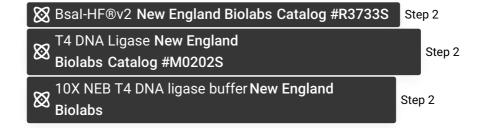
#### **ABSTRACT**

2023 NUS-Singapore iGEM team followed this protocol to assemble DNA oligos containing Golden Gate restriction sites with a plasmid backbone that contains the same restriction sites. The restriction enzymes utilised in this protocol are the Type IIS restriction enzymes, specifically Bsal. The use of Type IIS restriction enzymes ensures that there is no scar or extra sequence at the junctions between the assembled fragments.

#### **GUIDELINES**

This protocol outlines the Golden Gate procedures with a sample volume of 20 µL per reaction.

#### PROTOCOL MATERIALS



#### SAFETY WARNINGS



- Proper lab PPE must be worn at all times.
- Thermal gloves shall be worn when handling items from \$\circ\$ -20 °C fridge.

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#### **PROTOCOL** integer ID:

88975

**Keywords:** Golden Gate, Assembly, DNA Assembly, DNA, Bsal, Restriction site, Restriction enzyme

### **Golden Gate Assembly**

1 Prepare an ice box.

Place the Place the Biolabs

10X NEB T4 DNA ligase buffer New England
Biolabs

Biolabs

T4 DNA Ligase New England
Biolabs Catalog #R3733S in in ice.

3 Add the following reagents into a PCR tube:

Item	Volume
DI Water	10μL
Plasmid	1μL
PCR Extract Oligo	5μL
Bsal-HFv2 Enzyme	1μL
T4 DNA Ligase	1μL
T4 Ligase Buffer	2μL

#### Note

Reagents with enzymes such as Bsal-HFv2 Enzyme and T4 DNA Ligase must be kept at a low temperature (in ice) when they are in-use to prevent the enzymes from denaturation.

- 4 Put the sample into the Thermal Cycler and run it with the following conditions:
  - \*Set "Lid Temperature" to 105 °C and set "Volume" to 20 µL

Temperature	Duration
37°C	5 minutes
16°C	5 minutes
Go to step 1, repeat the cycle 40 times	
37°C	1 hour
60°C	15 minutes
12°C	Infinite Loop

# **Transformation**

1h 15m 45s

- **5** Prepare a box of ice.
- 6 Take an Eppendorf tube that contains pre-made competent cells from the 8 -80 °C fridge.
- 7 Immediately place the Eppendorf tube with competent cells into the ice box for 00:05:00
- Add the whole Golden Gate Assembly product ( $^{\text{$\bot$}}$  20  $^{\text{$\mu$}\text{$L$}}$ ) o into the Eppendorf tube containing the competent cells.
- 9 Tap the bottom of the Eppendorf tube to mix the solution.

Leave the Eppendorf tube in ice for 00:10:00

10m

- 11 Place the Eppendoft tube into a foam floating.
- Place them into the water bath for 00:00:45 at 42 °C for heat shock.

45e

- 13 Place the Eppendorf tube into the ice immediately
- 14 Add  $\angle$  1 mL of the LB media into the Eppendorf tube.
- Place the Eppendoft tube into the incubator at \$\ \ 37 \ c \ for \ 01:00:00 for recovery.
- 1h

16 Centrifuge the Eppendorf tube to form a cell pellet (no specific speed and time).

# **Plating and Incubation**

1h

17 Prepare an LB agar plate with the correct antibiotics.

- 19 Resuspend the cells by pipetting the solution.
- 20 Spread the cells onto the agar with the L-spreader.
- Place the petri dish in the incubator at 37 °C for Overnight to allow the colonies to grow.