

Cat. # 9057

For Research Use

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**TAKARA**

***E.coli* DH5  $\alpha$  Competent Cells**

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Product Manual

v1201Da

**Contents:**

<i>E. coli</i> DH5 $\alpha$ Competent Cells .....	10 vials x 100 $\mu$ l
pUC19 plasmid (0.1 ng / $\mu$ l) .....	1 vial x 10 $\mu$ l
SOC medium* .....	10 vials x 1 ml

* : SOC medium	2%	Bacto tryptone
	0.5%	Bacto yeast extract
	10 mM	NaCl
	2.5 mM	KCl
	10 mM	MgSO <sub>4</sub>
	10 mM	MgCl <sub>2</sub>
	20 mM	Glucose

**Specification:**

*E. coli* DH5  $\alpha$  Competent Cells, prepared by Hanahan's method modified by Takara Bio, is a host for transformation. It can be used for Blue / White screening utilizing the activity of  $\beta$ -galactosidase ( $\alpha$ -complementation) in combination use of pUC vectors. As this strain does not carry *lac I<sup>q</sup>*, basically IPTG is not needed. Therefore, *E. coli* DH5  $\alpha$  Competent Cells allows easy selection of recombinant clones with X-Gal when constructing gene library or subcloning recombinant plasmid.

X-Gal : 5-Bromo-4-Chloro-3-Indolyl- $\beta$ -D-Galactoside

**Protocols:**Transformation with a plasmid vector

- 1) Thaw *E. coli* DH5  $\alpha$  Competent Cells in an ice bath just before use.
- 2) Gently mix cells and transfer 100  $\mu$ l into a 14 ml round-bottom tube (BD Falcon 352059 or 352057).  
**Important:** Do not use a vortex to mix cells.
- 3) Add DNA sample (  $\leq$  10 ng is recommended.)
- 4) Keep in the ice bath for 30 min.
- 5) Incubate cells for 45 sec. at 42°C .
- 6) Return to the ice bath for 1 - 2 min.
- 7) Add SOC medium (pre-incubated at 37°C ) up to a final volume of 1 ml.
- 8) Incubate by shaking (160 - 225 rpm) for 1 hour at 37°C .
- 9) Plate an appropriate amount of culture on selective medium.\*
- 10) Incubate overnight at 37°C .

\* : Plate no more than 100  $\mu$ l for a 9 cm diameter plate. If necessary, dilute the culture with the same medium as used in step 7).

**Please read before proceeding:**

- 1) Place a vial of competent cells in a dry ice / EtOH bath immediately upon removal from -80°C freezer. Keep cells in bath until you are ready to proceed.
- 2) You may use 1.5 ml microcentrifuge tubes instead of 14 ml round bottom tubes (BD company Code: 352059 or 352057, etc.) for transformation, but it may reduce efficiency.
- 3) For 100  $\mu$ l of competent cell, use 10 ng or less of high-purified sample DNA. If not, transformation efficiency might decrease.
- 4) If you change the quantity of competent cells, or type of tubes used, it might be necessary to reevaluate the conditions. For example, when using 1.5 ml microcentrifuge tubes, heat shock for 60 seconds at 42°C rather than 45 seconds.
- 5) L-broth or  $\phi$  b-broth can be used instead of SOC medium. In this case, lower efficiency might be obtained.

L-broth :

Ingredient	per liter water
Bacto tryptone .....	10 g
Bacto yeast extract .....	5 g
NaCl .....	5 g

Adjust to around pH7.5 with 1 N NaOH and autoclave.

$\phi$  b-broth:

Ingredient	per liter water
Bacto tryptone .....	20 g
Bacto yeast extract .....	5 g
MgSO <sub>4</sub> · 7H <sub>2</sub> O .....	5 g

Adjust to around pH7.5 with 1 N KOH and autoclave.

- 6) When adding X-Gal, follow the procedures described as below:
  - Add 20 mg/ml X-Gal (dissolved in dimethylformamide) at a ratio of 200 - 300  $\mu$ l/100 ml agar media.
- 7) DH5  $\alpha$  can be used for the replication of M13mp vectors.  
But the strain can not form plaques, as it does not carry F factor.
- 8) It is not recommended to refreeze and store the thawed competent cells. However, if necessary, freeze in a dry ice/EtOH bath and return to -80°C . The transformation efficiency can be lowered by more than one magnitude.

**Transformation efficiency:**

1 ng of pUC19 was transformed and selected by Amp<sup>+</sup> selective media plating.  
Transformation efficiency > 1 x 10<sup>8</sup> transformants /  $\mu$ g pUC19

 **$\alpha$ -complementation of  $\beta$ -galactosidase:**

When transformed with a pUC19 plasmid, blue colonies appeared on an L-agar plate containing 100  $\mu$ g/ml ampicillin and 60  $\mu$ g/ml X-Gal.

**Genotype:**

*E. coli* DH5  $\alpha$  : F<sup>-</sup>,  $\phi$  80d/lacZ $\Delta$ M15,  $\Delta$ (lacZYA-argF)U169, *deoR*, *recA1*, *endA1*,  
*hsdR17*(rK<sup>-</sup>, mK<sup>+</sup>), *phoA*, *supE44*,  $\lambda$ <sup>-</sup>, *thi-1*, *gyrA96*, *relA1*

**Cell density:**

1 - 2 x 10<sup>9</sup> cells/ml

**Storage:** -80°C

**Note:** If it is not stored at -80°C, transformation efficiency may decrease. In this case, it is recommended to confirm the efficiency by using supplied pUC19 prior to use an application. Do not store in liquid nitrogen.

**Reference:**

Hanahan, D. (1983) *J.Mol.Biol.* **166**, 557.

**Related products:**

*E. coli* DH5  $\alpha$  Electro-Cells (Cat. #9027)

pUC19 DNA (Cat. #3219)

X-Gal (5-Bromo-4-Chloro-3-Indolyl- $\beta$ -D-Galactoside) (Cat. #9031)

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**NOTE:** This product is for research use only. It is not intended for use in therapeutic or diagnostic procedures for humans or animals. Also, do not use this product as food, cosmetic, or household item, etc.

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