invitrogen™

ElectroMAX™ DH5α-E™ Cells

Cat. No. 11319-019

Size: 0.5 ml
Store at -80°C
(Do not store in liquid nitrogen)

Description

ElectroMAX™ DH5α-E™ Cells are *E. coli* cells which can be transformed by electroporation (1,2). These cells can only be transformed by electroporation and are **not** transformed by "heat shock". DH5α-E™ Cells are suitable for the generation of cDNA libraries using pUC or pBR322-derived vectors. The ϕ80*lac*ZΔM15 marker provides α-complementation of the ß-galactosidase gene allowing blue/white screening on agar plates containing X-gal or Bluo-gal. DH5α-E™ allows efficient transformation of large plasmids and can also serve as a host for M13mp cloning vectors if a lawn of DH5αF′™, DH5αF′IQ™, JM101, or JM107 is provided to allow plaque formation. We do not recommended using this strain for direct cloning of methylated genomic DNA.

Component	Amount
DH5α-E™ Cells	5 x 100 µl
pUC19 DNA (10 pg/µl)	50 µl
S.O.C. Medium	2 x 6 ml

Genotype

F$^-$ ϕ80*lac*ZΔM15 Δ(*lac*ZYA-*arg*F) U169 *rec*A1 *end*A1 *hsd*R17 (r_k^-, m_k+) *gal*$^-$ *pho*A *sup*E44 λ$^-$ *thi*$^-$1 *gyr*A96 *rel*A1

Quality Control

ElectroMAX™ DH5α-E™ Cells are tested for transformation efficiency using the protocol on the next page and the following electroporator conditions: 2.0 kV, 200 Ω, 25 µF. Transformation efficiency should be >1.0×10^{10} transformants/µg of pUC19 DNA.

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Transformation Procedure

pUC19 control DNA (10 pg/µl) is provided to check transformation efficiency. Use experimental DNA that is free of phenol, ethanol, salts, protein, and detergents to obtain maximum transformation efficiency.

1. Add DNA to microcentrifuge tubes.
   A. To determine transformation efficiency, add 1 µl of the pUC19 control DNA to a microcentrifuge tube.
   B. For ligation reactions, precipitate the reactions with ethanol and resuspend in TE Buffer (10 mM Tris HCl, pH 7.5; 1 mM EDTA). The concentration of resuspended DNA should not exceed 100 ng/µl. Add 1 µl of the DNA to a microcentrifuge tube (see Note 1).
2. Thaw ElectroMAX™ DH5α-E™ cells on wet ice.
3. When cells are thawed, mix cells by tapping gently. Add 20 µl of cells to each chilled microcentrifuge tube.
4. Refreeze any unused cells in a dry ice/ethanol bath for 5 minutes before returning them to the -80°C freezer. Do not use liquid nitrogen. Although the cells are refreezable, subsequent freeze-thaw cycles will decrease transformation efficiency.
5. Pipette the cell/DNA mixture into a chilled 0.1 cm cuvette and electroporate. If you are using the BTX® ECM® 630 or BioRad GenePulser® II electroporator, we recommend using the following electroporator conditions: 2.0 kV, 200 Ω, 25 µF (see Note 2).
6. To the cells in the cuvette, add 1 ml of S.O.C. medium and transfer the solution to a 15 ml snap-cap tube (*e.g.* Falcon™ tube).
7. Shake at 225 rpm (37°C) for 1 hour.

8. Dilute cells transformed with pUC19 control DNA 1:100 with S.O.C. medium. Spread 50 µl of the dilution on prewarmed LB plates containing 100 µg/ml ampicillin.
9. Dilute experimental reactions as necessary and spread 100-200 µl on selective plates.
10. Incubate plates overnight at 37°C.

Growth of Transformants for Plasmid Preparations

Grow ElectroMAX™ DH5α-E™ Cells which have been transformed with a pUC-based plasmid overnight at 37°C in TB (3). A 100 ml culture in a 500 ml baffled shake flask will yield approximately 1 mg of pUC19 DNA.

Notes

1. Transformation efficiencies will be 10- to 100-fold lower for ligation mixtures and cDNA than for an intact control plasmid such as pUC19. **Salts and buffers severely inhibit electroporation.** Ligation reactions can be diluted 5-fold, and 1 µl added to 20 µl of cells. For optimal results, precipitate ligation mixtures with ethanol prior to transformation. Use only 1 to 2 µl of the resuspended DNA per 20 µl reaction. Adding undiluted ligation mixtures or too high a volume of DNA decreases transformation efficiency and increases the risk of arcing.
2. If you are using an electroporator other than a BTX® ECM® 630 or BioRad GenePulser® II electroporator, you may need to vary the settings to achieve optimal transformation efficiency.

3. Transformation efficiency (CFU/µg):

$$\frac{\text{CFU on control plate}}{\text{pg pUC19 DNA}} \times \frac{1 \times 10^6 \text{ pg}}{\mu\text{g}} \times \frac{\text{volume of transformants}}{\text{volume plated}} \times \text{dilution factor}$$

For example, if 10 pg of pUC19 yields 50 colonies when 50 µl of a 1:100 dilution is plated, then:

$$\text{CFU}/\mu\text{g} = \frac{50 \text{ CFU}}{10 \text{ pg}} \times \frac{1 \times 10^6 \text{ pg}}{\mu\text{g}} \times \frac{1 \text{ ml}}{0.05 \text{ ml plated}} \times 10^2 = 1.0 \times 10^{10}$$

References

1. Calvin, N. M., and Hanawalt, P. C. (1988) *J. Bacteriol. 170*, 2796.
2. Dower, William J., *et al*. (1988) *Nucl. Acids Research 16*, 6127.
3. Tartof, K. D. and Hobbs, C. A., (1987) *Focus® 9:2*, 12.