

# FACT SHEET

## E.coli strains and the NIH Guidelines

### Which recombinant strains of *E. coli* are exempt from the NIH Guidelines and do not require IBC registration and review?

The National Institutes of Health (NIH) Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines) states that with some exceptions, the experimental use of *Escherichia coli* (*E. coli*) K-12 Host-Vector Systems and its derivatives are exempt from the IBC review and approval requirements of the NIH Guidelines.

These exemptions apply provided that: (i) the *Escherichia coli* host does not contain conjugation proficient plasmids or generalized transducing phages; or (ii) lambda or lambdoid or Ff bacteriophages or non-conjugative plasmids are used as vectors. However, experiments involving the insertion into *Escherichia coli* K-12 of DNA from prokaryotes that exchange genetic information with *Escherichia coli* may be performed with any *Escherichia coli* K-12 vector (e.g., conjugative plasmid). When a non-conjugative vector is used, the *Escherichia coli* K-12 host may contain conjugation-proficient plasmids either autonomous or integrated, or generalized transducing phages. For these exempt laboratory experiments, Biosafety Level-1 physical containment conditions are recommended.

However, the following categories are not exempt from the NIH Guidelines: (i) experiments described in Section III-B which require NIH OSP and Institutional Biosafety Committee approval before initiation, (ii) experiments involving the cloning and expression of DNA from Risk Groups 3, 4, or restricted organisms or cells known to be infected with these agents, (iii) large-scale experiments (e.g., more than 10 liters of culture), and (iv) experiments involving the cloning of toxin molecule genes coding for the biosynthesis of molecules toxic for vertebrates.

Included is a list of some commonly used strains of *E. coli*, and the NIH Guidelines category applicable to those strains.

The following *E. coli* laboratory strains are K12 or derived from K-12 and therefore most research utilizing these strains is exempt from the NIH Guidelines. **(RG1, Exempt, NIH Guideline III-F, F-8, Appendix C-II)**

#### Ancestral *E. coli* K-12

Strain Designation	Origin or Collection
58	Stanford Strain
679	Stanford Strain
WG1	Wisconsin Strain

#### *E. coli* K-12 Derivatives

Strain Designation	Origin or Collection	Strain Designation	Origin or Collection
5K	Lab strain	JC9387	Lab strain
58	Lab strain	JM83	Lab strain
58-161	Lab strain	JM101	Lab strain
AB284	Lab strain	KP7600	Lab strain
AB311	Lab strain	LE392	Lab strain
AG1	Lab strain	M15	Lab strain
C600	Lab strain	MB408	Lab strain
Cavalli Hfr	Lab strain	MG1655	Lab strain
DH1	Lab strain	Novablue	Novagen
Dh5-alpha	Lab strain	P678	Lab strain
DP50	Lab strain	PA 309	Lab strain
EMG2	Lab strain	REG-12	Lab strain
EPI100-T1R	Lab strain	S17-1	Lab strain
H1443	Lab strain	SCS-110	Stratagene
HB101	Lab strain	SM10	Lab strain
Hfr3000	Lab strain	STBL2	Invitrogen
Hfr 3000 X74	Lab strain	STBL3	Invitrogen
HMS 174	Novagen	SURE	Lab strain
JM109	Lab strain	TB1	NEB
TG1	Lab strain	WA704	Lab strain
TOP10	Invitrogen	W1485	Lab strain
W1485	Lab strain	W3110	Lab strain
W208	Lab strain	XL1-Blue	Stratagene
W3110	Lab strain	XL10-Gold	Stratagene
W945	Lab strain	XL0LR	Stratagene
WA704	Lab strain	Y10	Lab Strain
WG1	Lab strain	YN2980	Lab Strain

## ***E. coli* NOT Derived from K-12**

The following *E. coli* laboratory strains are not derived from K-12 and therefore any research utilizing these strains is not exempt from the NIH Guidelines.

### **Non-K12 *E. coli* strains (RG1, not exempt, falls under NIH Guideline III-E)**

<b>Strain Designation</b>	<b>Origin or Collection</b>	<b>Strain Designation</b>	<b>Origin or Collection</b>
B	Laboratory strain	K5808	Laboratory strain
B-3	Laboratory strain	Mach1	Invitrogen
B/R	Laboratory strain	Nissile 1917	Laboratory strain
BL21	Novagen	Rosetta	Novagen
BL23	NEB	REG-811	Laboratory strain
C	Laboratory strain	TOPP	Stratagene
C41	Sigma Aldrich	W	Laboratory strain
C43	Sigma Aldrich	25922	Laboratory strain
FDA strain Seattle 1946	Laboratory strain		

### **Pathogenic *E. coli* strains (not exempt, III-D NIH Guidelines)**

<b>Strain Designation</b>
<i>E. coli</i> , all strains bearing K1 antigen
<i>E. coli</i> enteroaggregative strain (EAEC)
<i>E. coli</i> enterohaemorrhagic strain (EHEC)
<i>E. coli</i> enteroinvasive strain (EIEC)
<i>E. coli</i> enteropathogenic strain (EPEC)
<i>E. coli</i> enterotoxigenic strain (ETEC)
<i>E. coli</i> Shiga toxin-producing <i>E. coli</i> (O157:H7)

## **References**

- Adapted from [UC San Diego Guidelines](#)
- [EcoliWiki](#)
- [NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules \(NIH Guidelines\)](#)
- [National Center for Biotechnology Information \(NCBI\) Taxonomy Browser: E.coli genome](#)
- [NCBI Rapid and accurate identification of Escherichia coli K-12 strains](#)
- [The University of Iowa: E. coli Derivatives](#)
- [Virginia Polytechnic Institute and State University: E. coli Strain Information](#)
- [Yale: The Coli Genetic Stock Center, E. coli Genetic Resources](#)