

Escherichia coli strains and the NIH Guidelines

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

E. coli K-12 and its derivatives are considered nonpathogenic to humans for a number of reasons:

1. The outer membrane has a defective LPS core which affects attachment to gut mucosa
2. Lacks the type of glycocalyx required for attachment
3. Is unable to express capsular (K) antigens necessary for colonization and virulence.

Thus, *E. coli* K-12 is unable to colonize the human intestinal tract under normal conditions.

E. coli strains that are **NOT** exempt and require registration with the IBC include many of the strains used for protein expression such as B, C, TOPP and BL-21. These strains typically contain the lambda temperate prophage, a genetically mobile element that could lead to specialized transduction and genetic exchange with other organisms. These strains still possess colonization factors that could lead to gut colonization.

Below is a list of some commonly used strains of *E. coli* K12 and K12 derivatives, and the NIH Guidelines category applicable to those strains. **(RG1, Exempt, NIH Guideline Sections III-F, F-8 and Appendix C-II apply)**

Ancestral *E. coli* K12 strains

<u>Strain Designation</u>	<u>Origin or collection</u>
58	Stanford strain
679	Stanford strain
WG1	Wisconsin strain

E. coli K12 derivatives

Strain	Origin or Collection	Strain	Origin or Collection
5K	Lab strain	MG1655	Lab strain
58	Lab strain	Novablue	Novagen
58-161	Lab strain	P678	Lab strain
AB284	Lab strain	PA 309	Lab strain
AB311	Lab strain	REG-12	Lab strain
AG1	Lab strain	S17-1	Lab strain
C600	Lab strain	SCS-110	Stratagene
Cavalli Hfr	Lab strain	SM10	Lab strain
DH1	Lab strain	STBL2	Invitrogen
DH5-alpha	Lab strain	STBL3	Invitrogen
DP50	Lab strain	SURE	Lab strain
EMG2	Lab strain	TB1	NEB
EPI100-T1R	Lab strain	TG1	Lab strain
H1443	Lab strain	TOP10	Invitrogen
HB101	Lab Strain	W1485	Lab strain
Hfr3000	Lab strain	W208	Lab strain



Strain	Origin or Collection	Strain	Origin or Collection
Hfr3000 X74	Lab strain	W3110	Lab strain
HMS 174	Novagen	W945	Lab strain
JM109	Lab strain	WA704	Lab strain
JC 9387	Lab strain	WG1	Lab strain
JM83	Lab strain	XI1-Blue	Stratagene
JM101	Lab strain	XL10-Gold	Stratagene
KP7600	Lab strain	XL0LR	Stratagene
LE392	Lab strain	Y10	Lab strain
M15	Lab strain	YN2980	Lab strain
MB 408	Lab strain		

***E. coli* strains NOT derived from K12 (RG1, not exempt, Section III-E of the NIH Guideline applies)**

Strain	Origination	Strain	Origination
B	Lab strain	K5805	Lab strain
B-3	Lab strain	Mach 1	Invitrogen
B/R	Lab strain	Nissile 1917	Lab strain
BL21	Novagen	Rosetta	Novagen
BL23	NEB	REG-811	Lab strain
C	Lab strain	TOPP	Stratagene
C41	Sigma Aldrich	W	Lab strain
C43	Sigma Aldrich	25922	Lab strain
FDA Strain Seattle 1946	Lab strain		

Pathogenic *E. coli* strains (RG2, not exempt, Section III-D NIH Guidelines applies)

All *E. coli* strains bearing K1 antigen

E. coli enteroaggregative strain (EAEC)

E. coli enterohaemorrhagic strain (EHEC)

E. coli enteroinvasive strain (EIEC)

E. coli enteropathogenic strain (EPEC)

E. coli enterotoxigenic strain (ETEC)

E. coli Shiga toxin-producing (O157:H7)

References

- [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](#)