

LIST OF GMAC-APPROVED HOST/VECTOR SYSTEMS

BIOLOGICAL CONTAINMENT

	Host	Vector
Bacteria	<i>Escherichia coli</i> K12 or <i>E. coli</i> B derivatives which do not contain conjugative or generalized transducing phages	<ol style="list-style-type: none">1. Non-conjugative plasmids2. Bacteriophage<ul style="list-style-type: none">- lambda- lambdoid- Fd or F1 (e.g.M13)
	<i>Bacillus subtilis</i> or <i>B. licheniformis</i> Asporogenic strains with a reversion frequency of less than 10^{-7}	Indigenous <i>Bacillus</i> plasmids and phages whose host range does not include <i>B. cereus</i> or <i>B. anthracis</i>
	<i>Pseudomonas putida</i> Strain KT 2440	Certified plasmids: pKT 262, pKT 263, pKT 264
	<i>Streptomyces</i> -specified species: <i>S. coelicolor</i> <i>S. lividans</i> <i>S. parvulus</i> <i>S. griseus</i>	<ol style="list-style-type: none">1. Certified plasmids: SCP2, SLP1, SLP2 PIJ101 and derivatives2. Actinophage phi C31 and derivatives
Fungi	<i>Neurospora crassa</i> , laboratory strains	No restriction
	<i>Saccharomyces cerevisiae</i>	No restriction
	<i>Pichia pastoris</i>	No restriction

	<i>Schizosaccharomyces pombe</i>	No restriction
Slime moulds	<i>Dictyostelium</i> species	<i>Dictyostelium</i> shuttle vectors, including those based on the endogenous plasmids Ddp1 and Ddp2
Tissue Culture	Mammalian cells	<ol style="list-style-type: none"> 1. Non-viral vectors 2. Replication defective viral vectors that cannot infect human cells 3. HIV-based lentiviral vector system that falls under the BATA Fourth Schedule¹ 4. Adeno-associated viral vectors
	Avian cells	<ol style="list-style-type: none"> 1. Avipoxvirus vectors 2. Adeno-associated viral vectors
	Plant cell cultures	Non-tumorigenic disabled Ti plasmid vectors in <i>Agrobacterium tumefaciens</i> and non-pathogenic viral vectors
	Insect cell cultures, such as <i>Spodoptera frugiperda</i> ²	Baculovirus (<i>Autographa californica</i> nuclear polyhedrosis virus)

*Updated May 2021

¹ Please refer to Appendix 11 of the Singapore Biosafety Guidelines for Research on Genetically Modified Organisms for more details. To find out if the HIV-based lentiviral vector system falls under the Fourth Schedule, please refer to the MOH Biosafety FAQs under Category 3. Possession “How do I know if a HIV lentiviral vector system falls under the BATA Fourth Schedule?” – <https://www.moh.gov.sg/biosafety/faqs>

² Provided the recombinants are also inclusion-negative (e.g. polyhedrin minus)