

Use Instruction - Human SAM genome-wide library (3-plasmid system)

Product Info

The CRISPR activation library targets 23,430 genes across the human genome and contains a total of 70,290 gene activation plasmid vectors, of which 3 gene activation plasmid vectors. The library uses Lenti sgRNA(MS2)_puro optimized backbone as the backbone, which is a triple plasmid system that expresses only gRNA, while the dCas9-VP64 and MS2-P65-HSF1 genes are on two other different vectors that need to be used in combination.

Library Details

Product Name	Human SAM genome-wide library (3-plasmid system)
Product Catalog	LIBR-H026-P
Product Details	70290gRNAs (gRNA sequences see attachment); Three-plasmid system; Puro resistance, puromycin can be used for antibiotic screening upon cell infection; Plasmids paired with 3rd lentivirus packaging system can be directly used for virus packaging. * It is recommended to use Ubigen's Lentiviral Packaging Kit(Cat# YK-LVP-05) Targeting 23430 genes,3gRNAs per gene; .

Backbone Map	
Verification Primers	lenti sgRNA(MS2)-F:atttcttgggtagtttgcagttt lenti sgRNA(MS2)-R:gccaagttgataacggactagcctt PCR Fragment: 226 bp The above primers can be used for PCR fragment amplification before library NGS sequencing. The amplified fragments can be purified and used for NGS sequencing.
Product Specifications	Ready-to-use, endotoxin-free, maxiprep plasmids, verified by Next Generation Sequencing, with coverage >99% and uniformity <10.

Product Use Instruction

Part 1. Lentivirus Packaging

Mix library plasmid constructs with 3rd generation lentiviral packaging constructs to be co-transfected into 293T cells (Recommend: Ubigene's 293T cell line specialized for virus packaging, cat#YC-A006). 48 or 72 hours upon transfection, collect lentiviral supernatant and the virus can be used upon concentration. The virus should be stored at -80°C.

Part 2. Library Plasmid Amplification

1. Library plasmid electroporation

Add 50 ng library plasmid to 25 μL electrocompetent cells with transformation efficiency $\geq 10^9$ cfu/μg, electroporate cells as per electroporation parameters. Upon electroporation, add 975 μL recovery medium, mix well and transfer to a tube, then add 1 ml recovery medium to the tube and mix well again. Repeat above steps for 7 times and

get 8 electroporation end products, share the tubes at 37°C, 250 rpm for 1 hour.

2. Culture of amplified library and calculation of transformation efficiency

1) Mix the 8 tubes of electroporation end products and take 10 µL and dilute with 990 µL recovery medium. Plate 20 µL dilution onto a 10 cm Petri dish and incubate plates at 32°C for 14 hours. Count the colonies in the dish. If the number of colonies is 40000X greater than 2.11×10^7 , move on to the next step. If it is less than 2.11×10^7 , redo this step.

*** Note: It is recommended that the number of colonies should be 40000X greater than 3.51×10^7 to ensure the uniformity of Library gRNA.**

2) For the remaining electroporation end products, plate 400 µL/dish (40 dishes can be plated in total), then incubate at 37°C for overnight.

3. Collect transformation products

1) Collect the bacteria to a 50 mL centrifuge tube.

2) Centrifuge tubes to pellet bacteria, decant LB and weigh pellet (bacteria).

4. Maxiprep

Maxiprep the plasmid DNA according to the instruction for maxiprep kit, it is recommended to use endofree maxiprep kit from well-known, commercial brands such as QIAGEN and MACHEREY-NAGEL. (E.g. EndoFree Plasmid Mega Kit from QIAGEN)

Part 3. Library Screen

1. Determine infect MOI

Dilute the library virus into different gradients, such as MOI=0.3, 0.5, 1, 5, 10, 30, 100 to infect the target cells (the cell confluency is 30-50%). Each gradient needs to be set with 2 wells. After 48 hours of infection, add puromycin according to the settings in the table below for screening, and stop antibiotic screening when all cells in the blank group (cells not infected with virus) die. The MOI with a survival rate of 30% after antibiotic screening is the virus infection condition for the library screening experiment, that is, infect MOI.

Group#	MOI	Antibiotic screening	Cell amount upon antibiotic screening	Survival rate upon antibiotic screening
Experimental group 1	0.3	Yes	N1	N1/M1
Experimental	0.5	Yes	N2	N2/M2

group 1				
Experimental group 3	1	Yes	N3	N3/M3
Experimental group 4	5	Yes	N4	N4/M4
Experimental group 5	10	Yes	N5	N5/M5
Experimental group 6	30	Yes	N6	N6/M6
Experimental group 7	100	Yes	N7	N7/M7
Infection blank group 1	0.3	No	M1	--
Infection blank group 2	0.5	No	M2	--
Infection blank group 3	1	No	M3	--
Infection blank group 4	5	No	M4	--
Infection blank group 5	10	No	M5	--
Infection blank group 6	30	No	M6	--
Infection blank group 7	100	No	M7	--
Blank group	0	Yes	--	--

2. Transduction with library virus

① Determine the amount of cells and virus

Cell amount = gRNA# × gRNA coverage / 30% * gRNA coverage > 500 fold

Virus amount = cell amount × infect MOI

② Expand the cells according to the cell amount calculated in step ①, and prepare sufficient virus.

③ Use library virus to infect the target cells, upon Puro screening, divide the screened cells into experimental group and control group. Add target drugs to the experimental group for screening, upon screening, collect cells respectively from experimental group and control group (It is recommended to get at least 3.51×10^7 cells from control group; get all the cells from experimental group and the cell amount before cryopreservation should be greater than 5×10^6). Perform genome extraction for Next Generation Sequencing, and then compare and analyze the gRNAs of the experimental group and the control group.

Relevant products and service

Ubigen provides off-shelf libraries including Human/Mouse genome-wide plasmid library and some sub-libraries, and one-stop customized screening services for CRISPR-KO, CRISPRa, and CRISPRi including high-throughput sgRNA library construction, virus packaging, cell infection, drug screening, NGS sequencing, and data analysis, etc. Multiple deliverables fulfill different research needs!