Supplementary Materials

Table S1. Functional annotation of antimicrobial resistance genes

No.	Name	Drug_Class	pident
1	LptD	aminocoumarin antibiotic; peptide antibiotic; rifamycin antibiotic	100
2	oqxA	diaminopyrimidine antibiotic; fluoroquinolone antibiotic; glycylcycline; nitrofuran antibiotic; tetracycline antibiotic	100
3	tet(D)	tetracycline antibiotic	100
4	SHV-1	carbapenem; cephalosporin; penam	100
5	SHV-11	carbapenem; cephalosporin; penam	100
6	sul1	sulfonamide antibiotic	100
7	sul2	sulfonamide antibiotic	100
8	dfrA12	diaminopyrimidine antibiotic	100
9	qacEdelta1	disinfecting agents and antiseptics	100
10	Klebsiella pneumoniae KpnF	aminoglycoside antibiotic; cephalosporin; disinfecting agents and antiseptics; macrolide antibiotic; peptide antibiotic; rifamycin antibiotic; tetracycline antibiotic	100
11	Klebsiella pneumoniae KpnG	aminoglycoside antibiotic; carbapenem; cephalosporin; fluoroquinolone antibiotic; macrolide antibiotic; penam; penem; peptide antibiotic	99.7
12	OmpA	peptide antibiotic	99.7
13	oqxB	diaminopyrimidine antibiotic; fluoroquinolone antibiotic; glycylcycline; nitrofuran antibiotic; tetracycline antibiotic	99.5
14	eptB	peptide antibiotic	99.5
15	Klebsiella	aminoglycoside antibiotic; cephalosporin; disinfecting agents and	99.2

	pneumoniae KpnE	antiseptics; macrolide antibiotic; peptide antibiotic; rifamycin antibiotic; tetracycline antibiotic	
16	CRP	fluoroquinolone antibiotic; macrolide antibiotic;penam	99
17	ArnT	peptide antibiotic	98.9
18	Klebsiella pneumoniae OmpK37	carbapenem; cephalosporin; cephamycin; monobactam; penam; penem	98.9
19	fosA5	aminoglycoside antibiotic; fluoroquinolone antibiotic; phosphonic acid antibiotic	98.6
20	Klebsiella pneumoniae acrA	cephalosporin; disinfecting agents and antiseptics; fluoroquinolone antibiotic; glycylcycline; penam; phenicol antibiotic; rifamycin antibiotic; tetracycline antibiotic	95.2
21	cpxA	aminocoumarin antibiotic; aminoglycoside antibiotic	93.7
22	emrB	fluoroquinolone antibiotic	93.4
23	marA	carbapenem; cephalosporin; cephamycin; disinfecting agents and antiseptics; fluoroquinolone antibiotic; glycylcycline; monobactam; penam; penem; phenicol antibiotic; rifamycin antibiotic; tetracycline antibiotic	92.7
24	emrR	fluoroquinolone antibiotic	92.6
25	baeR	aminocoumarin antibiotic; aminoglycoside antibiotic	92.1
26	ramA	carbapenem; cephalosporin; cephamycin; disinfecting agents and antiseptics; fluoroquinolone antibiotic; glycylcycline; monobactam; penam; penem; phenicol antibiotic; rifamycin antibiotic; tetracycline antibiotic	92
27	msbA	nitroimidazole antibiotic	91.9

28	acrB	cephalosporin; disinfecting agents and antiseptics; fluoroquinolone antibiotic; glycylcycline; penam; phenicol antibiotic; rifamycin antibiotic; tetracycline antibiotic	91.5
29	mdtC	aminocoumarin antibiotic	91.3
30	acrD	aminoglycoside antibiotic	91.2
31	mdtB	aminocoumarin antibiotic	90

Table S2. Annotation of pathogen-host interactions (PHI)

No.	GeneName	Pathogen_Disease	Hostspecies	pident
1	Acrb	pneumonia	Caenorhabditis elegans (related: roundworm)	100
2	Fepa (vk055_1934)	pneumonia	Mus musculus (related: house mouse)	100
3	Ente (vk055_1924)	pneumonia	Mus musculus (related: house mouse)	100
4	Leuc	pneumonia	Mus musculus (related: house mouse)	100

5	Prov	pneumonia	Mus musculus (related: house mouse)	100
6	Entc (vk055_1925)	pneumonia	Mus musculus (related: house mouse)	100
7	Ompk35	pneumonia	Mus musculus (related: house mouse)	100
8	Leub	pneumonia	Mus musculus (related: house mouse)	100
9	Yhbu	pneumonia	Mus musculus (related: house mouse)	100
10	Lpxl2 (bn49_1538)	pneumonia	Galleria mellonella (related: Greater wax moth)	100
11	Lpxo	pneumonia	Galleria mellonella (related: Greater wax moth)	100
12	Fepb (vk055_1926)	pneumonia	Mus musculus (related: house mouse)	100
13	Fepd (vk055_1928)	pneumonia	Mus musculus (related: house mouse)	100
14	Fepg (vk055_1929)	pneumonia	Mus musculus (related: house mouse)	100
15	Fimh	pneumonia	Mus musculus (related: house mouse)	100
16	Fepc (vk055_1930)	pneumonia	Mus musculus (related: house mouse)	100
17	Ycge	pneumonia	Mus musculus (related: house mouse)	100
18	Gntr	pneumonia	Mus musculus (related: house mouse)	100
19	Fimc	pneumonia	Mus musculus (related: house mouse)	100
20	Deda	pneumonia	Mus musculus (related: house mouse)	100
21	Crp	pneumonia	Mus musculus (related: house mouse)	100
22	Leud	pneumonia	Mus musculus (related: house mouse)	100
23	Rcsb	pneumonia	Galleria mellonella (related: greater wax moth)	100
24	Maga	urinary tract infection; nosocomial pneumonia; abdominal infection	Mus musculus (related: house mouse)	100
25	Fima	pneumonia	Mus musculus (related: house mouse)	100
26	Fimi	pneumonia	Mus musculus (related: house mouse)	100

27	Fimf	pneumonia	Mus musculus (related: house mouse)	100
28	Yfir	pneumonia	Caenorhabditis elegans (related: roundworm)	100
29	Hns	pneumonia	Mus musculus (related: house mouse)	100
30	Rama (vk055_1983)	pneumonia	Mus musculus (related: house mouse)	100
31	Arne	pneumonia	Galleria mellonella (related: Greater wax moth)	100
32	Mdtj	pneumonia	Mus musculus (related: house mouse)	100
33	Ihfa	pneumonia	Homo sapiens (related: human)	100
34	Ihfb	pneumonia	Homo sapiens (related: human)	100
35	Arna	pneumonia	Galleria mellonella (related: Greater wax moth)	99.8
36	Yfib	pneumonia	Caenorhabditis elegans (related: roundworm)	99.8
37	Arnb	pneumonia	Galleria mellonella (related: Greater wax moth)	99.7
38	Oqxa	pneumonia	Caenorhabditis elegans (related: roundworm)	99.7
39	Arnc	pneumonia	Galleria mellonella (related: Greater wax moth)	99.7
40	Oqxb	pneumonia	Caenorhabditis elegans (related: roundworm)	99.6
41	Fimd	pneumonia	Mus musculus (related: house mouse)	99.6
42	Entb (vk055_1923); Entb	pneumonia	Mus musculus (related: house mouse)	99.6
43	Yaaa	pneumonia	Mus musculus (related: house mouse)	99.6
44	Vk055_1980	pneumonia	Mus musculus (related: house mouse)	99.5
45	Yfin	pneumonia	Caenorhabditis elegans (related: roundworm)	99.5
46	Ybdk (vk055_1976)	pneumonia	Mus musculus (related: house mouse)	99.5
47	Mrka	pneumonia	Mus musculus (related: house mouse)	99.5
48	Beti (vk055_1951)	pneumonia	Mus musculus (related: house mouse)	99.5
49	Vk055_1952	pneumonia	Mus musculus (related: house mouse)	99.4
50	Vk055_1939	pneumonia	Mus musculus (related: house mouse)	99.4

51	Fimg	pneumonia	Mus musculus (related: house mouse)	99.4
52	Pgac	pneumonia	Mus musculus (related: house mouse)	99.3
53	Rara	pneumonia	Caenorhabditis elegans (related: roundworm)	99.3
54	Lpxl1 (bn49_2155)	pneumonia	Galleria mellonella (related: Greater wax moth)	99.3
55	Ykfe (vk055_1949)	pneumonia	Mus musculus (related: house mouse)	99.3
56	Leua	pneumonia	Mus musculus (related: house mouse)	99.2
57	Vk055_1961	pneumonia	Mus musculus (related: house mouse)	99.2
58	Arnt	pneumonia	Galleria mellonella (related: Greater wax moth)	99.1
59	Fimk	pneumonia	Mus musculus (related: house mouse)	99.1
60	Ccma (vk055_1938)	pneumonia	Mus musculus (related: house mouse)	99.1
61	Phoq	pneumonia	Galleria mellonella (related: greater wax moth)	98.8
62	Enta (vk055_1922)	pneumonia	Mus musculus (related: house mouse)	98.8
63	Pagp	pneumonia	Galleria mellonella (related: Greater wax moth)	98.8
64	Vk055_1944	pneumonia	Mus musculus (related: house mouse)	98.7
65	Arnd	pneumonia	Galleria mellonella (related: Greater wax moth)	98.7
66	Arnf	pneumonia	Galleria mellonella (related: Greater wax moth)	98.4
67	Entf (vk055_1931)	pneumonia	Mus musculus (related: house mouse)	98.2
68	Mdti	pneumonia	Mus musculus (related: house mouse)	97.2
69	Ompk36	pneumonia	Galleria mellonella (related: greater wax moth)	95.4
70	Tonb	pneumonia	Mus musculus (related: house mouse)	94.7
71	Ompa2	pneumonia	Galleria mellonella (related: greater wax moth)	91

Table S3. Annotation of virulence factors

No.	VF_Gene	VF_Name	VFcategory	pident
1	hcp	T6SS	Effector delivery system	100
2	vipA	T6SS	Effector delivery system	100
3	entE	Ent	Nutritional / Metabolic factor	100
4	entS	Ent	Nutritional / Metabolic factor	100
5	fepD	Ent	Nutritional / Metabolic factor	100
6	fepG	Ent	Nutritional / Metabolic factor	100
7	fepC	Ent	Nutritional / Metabolic factor	100
8	fimD	Type I fimbriae	Adherence	100
9	fimE	Type I fimbriae	Adherence	100
10	fimI	Type I fimbriae	Adherence	100
11	fimA	Type I fimbriae	Adherence	100
12	ugd	Capsule	Immune modulation	100
13	mrkD	Type 3 fimbriae	Biofilm	100
14	mrkJ	Type 3 fimbriae	Biofilm	100
15	mrkH	Type 3 fimbriae	Biofilm	100
16	mrkF	Type 3 fimbriae	Biofilm	100

17	mrkA	Type 3 fimbriae	Biofilm	100
18	KP1_RS17225	LPS	Immune modulation	100
19	rfbA	LPS	Immune modulation	100
20	rfbB	LPS	Immune modulation	100
21	acrB	AcrAB	Antimicrobial activity / Competitive advantage	100
22	acrA	AcrAB	Antimicrobial activity / Competitive advantage	100
23	rcsB	RcsAB	Regulation	100
24	rcsA	RcsAB	Regulation	100
25	mrkC	Type 3 fimbriae	Biofilm	99.9
26	iutA	Aerobactin	Nutritional / Metabolic factor	99.9
27	gndA	Capsule	Immune modulation	99.8
28	rfbK1	Capsule	Immune modulation	99.8
29	clpV	T6SS	Effector delivery system	99.7
30	tssG	T6SS	Effector delivery system	99.7
31	fepB	Ent	Nutritional / Metabolic factor	99.7
32	fimH	Type I fimbriae	Adherence	99.7
33	KP1_RS17230	LPS	Immune modulation	99.7
34	iroE	Sal	Nutritional / Metabolic factor	99.7
35	vasE	T6SS	Effector delivery system	99.6
36	dotU	T6SS	Effector delivery system	99.6
37	fepA	Ent	Nutritional / Metabolic factor	99.6
38	entB	Ent	Nutritional / Metabolic factor	99.6
39	mrkB	Type 3 fimbriae	Biofilm	99.6
40	entF	Ent	Nutritional / Metabolic factor	99.5
41	fimB	Type I fimbriae	Adherence	99.5

42	mrkI	Type 3 fimbriae	Biofilm	99.5
43	icmF	T6SS	Effector delivery system	99.4
44	vipB	T6SS	Effector delivery system	99.4
45	sciN	T6SS	Effector delivery system	99.4
46	fimG	Type I fimbriae	Adherence	99.4
47	KP1_RS17280	Capsule	Immune modulation	99.4
48	KP1_RS17240	LPS	Immune modulation	99.4
49	entC	Ent	Nutritional / Metabolic factor	99.2
50	fimK	Type I fimbriae	Adherence	99.1
51	fimC	Type I fimbriae	Adherence	99.1
52	tssF	T6SS	Effector delivery system	99
53	fes	Ent	Nutritional / Metabolic factor	99
54	KP1_RS17220	LPS	Immune modulation	99
55	entA	Ent	Nutritional / Metabolic factor	98.8
56	impA	T6SS	Effector delivery system	98.7
57	rfbD	LPS	Immune modulation	98.7
58	gmd	Capsule	Immune modulation	98.4
59	ompA	T6SS	Effector delivery system	97.7
60	fimF	Type I fimbriae	Adherence	97.7
61	wcaJ	Capsule	Immune modulation	95.9
62	KP1_RS17355	Capsule	Immune modulation	95.7
63	KP1_RS17305	Capsule	Immune modulation	94.7
64	KP1_RS17345	Capsule	Immune modulation	93.3
65	KP1_RS17340	Capsule	Immune modulation	92.6
66	vgrG	T6SS	Effector delivery system	92.1

Table S4. Genomic islands

GI_chrom	GI_ID	GI_Start	GI_End	GI_Length
Chrom1	GI_1	726832	753714	26883
Chrom1	GI_2	1064541	1078778	14238
Chrom1	GI_3	1139364	1147533	8170
Chrom1	GI_4	1210331	1225733	15403
Chrom1	GI_5	2068379	2116497	48119
Chrom1	GI_6	2895585	2910318	14734
Chrom1	GI_7	2936707	2961678	24972
Chrom1	GI_8	3845667	3853489	7823
Chrom1	GI_9	3884118	3927961	43844

Table S5. Determination of the minimum inhibitory concentration (MIC) of PCP against KP.

	PCP (mg/mL)									
	5	2.5	1.25	0.625	0.313	0.156	0.078	0.039	0	Ceftriaxone
Result	+	+	+	+	+	+	+	+	+	-

Note: “+” indicates KP growth; “–” indicates KP growth inhibition.

Supplementary Materials

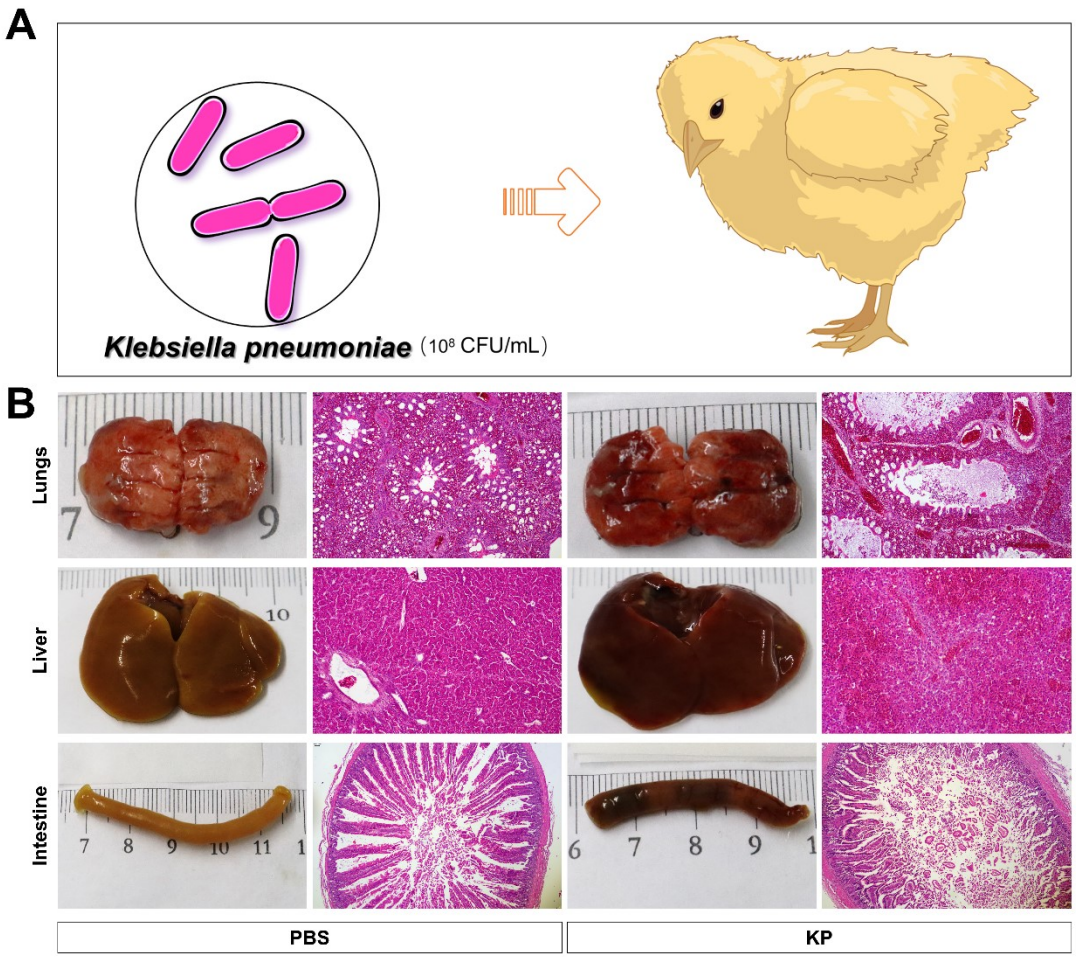

Figure S1. Infection of chicks with KP. (A) Schematic diagram of the experimental procedure; (B) Histological observation of visceral organs (lung, liver, and partial intestine).

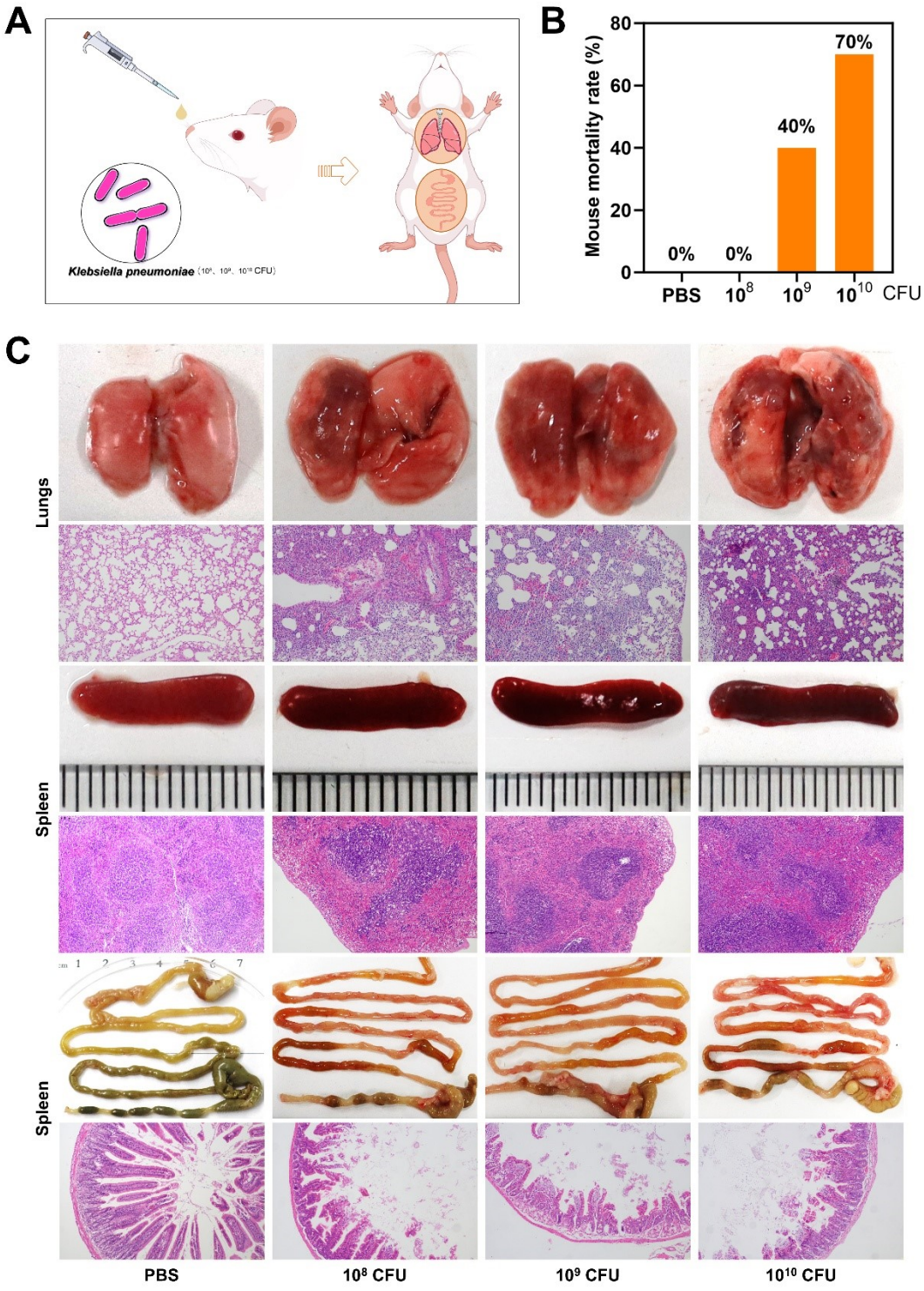

Figure S2. Establishment of KP-induced ALI model. A: Experimental flow chart. Mice were intranasally challenged with10^8, 10^9, 10^{10} CFU of KP, respectively. Tissues of lung, spleen, and intestine were collected 24 h post-challenge. B: Mortality rate; C: Gross pathology and histopathological changes of lungs, spleen, and intestines.

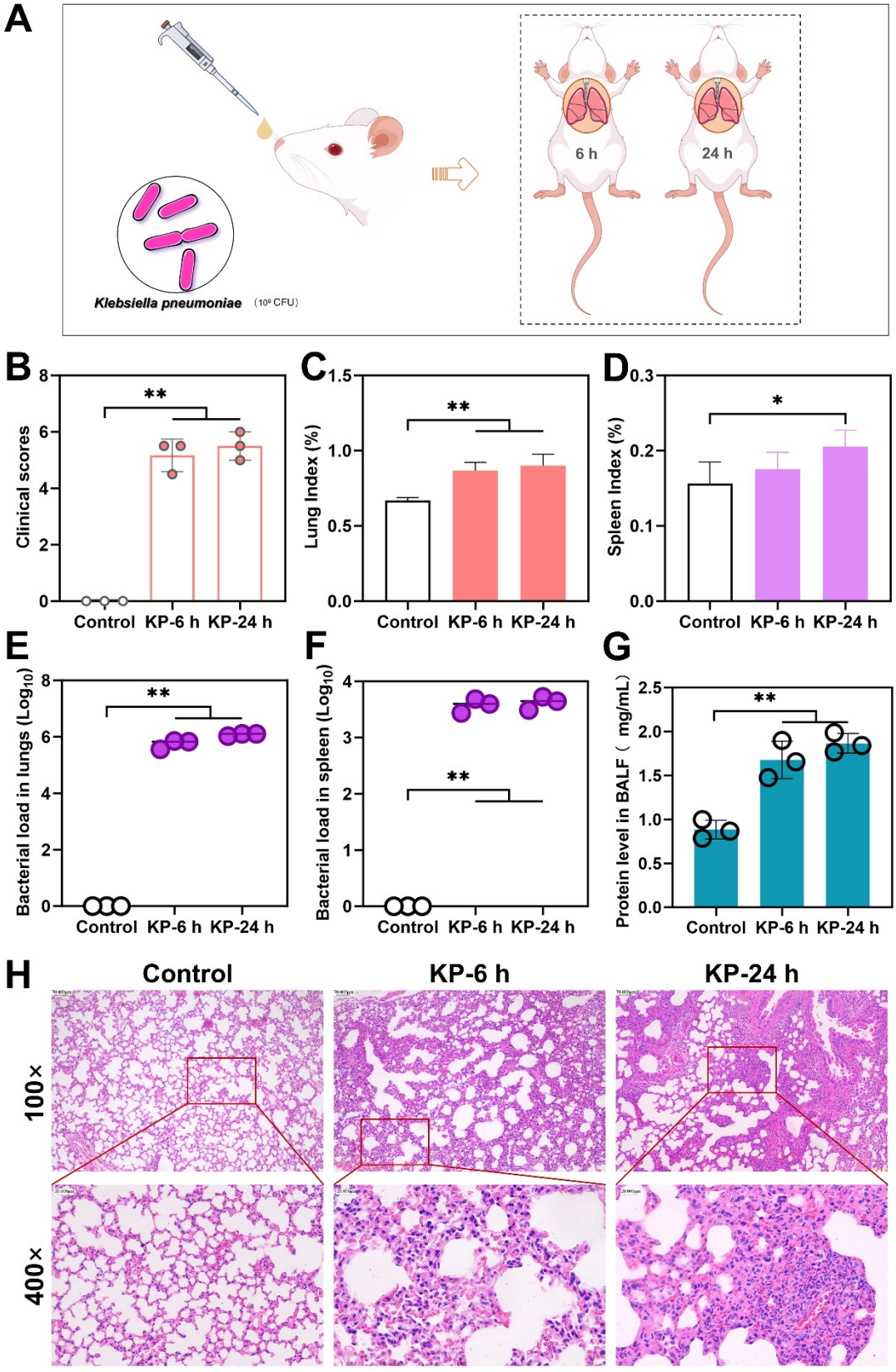

Figure S3. Comparison of different time points post KP infection. A: Experimental flow chart. Mice were intranasally challenged with10^8 CFU of KP, and lungs, spleens,

and intestines were collected at 6 h and 24 h post-challenge. B: Lung index; C: Spleen index; D: Bacterial load in lung; E: Bacterial load in spleen; F: BALF protein level; G: Protein concentration in BALF; H: HE staining sections. Data were expressed as means ± SD. *$p < 0.05$; **$p < 0.01$.

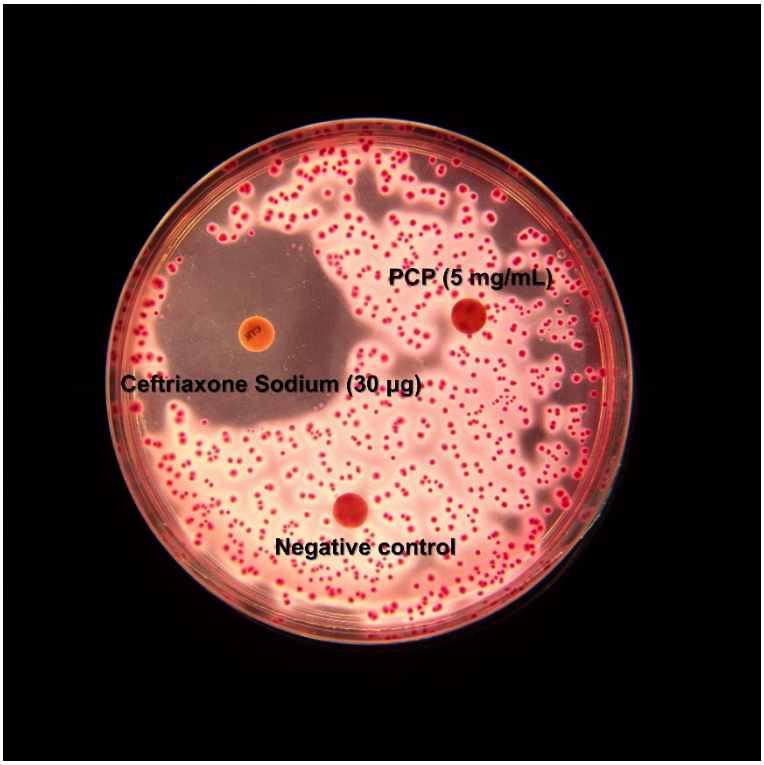

Figure S4. Antibacterial activity of PCP in vitro. The susceptibility disk test (K-B method) was performed to evaluate the inhibitory effect of PCP against KP in vitro. Filter paper disks impregnated with PCP (5 mg/mL), ceftriaxone sodium (positive control, 30 μg), or sterile water (negative control) were placed on MacConkey agar plates inoculated with KP.