Rag1-KO(Rag1-EGFP)

重组激活基因（regroup.activating genes，Rags）在V（D）J重组过程中发挥重要作用，V（D）J重组过程中发生的免疫球蛋白（Ig）基因和T细胞受体（TCR）基因的重排和重组是B细胞和T淋巴细胞成熟过程中的必需阶段。 小鼠的两个重组激活基因Rag1和Rag2均位于2

品系全名	B6.129S-*Rag1*$^{tm1(loxP-EGFP-PolyA-loxP-Neo-loxP)Smoc}$
目录号	NM-KI-00069
品系状态	活体

基因信息

基因名 **Rag1**	**基因曾用名**	Rag-1
	NCBI ID	19373
	MGI ID	97848
	Ensembl ID	ENSMUSG00000061311
	人类同源基因	RAG1
	人类同源基因关联疾病	奥门综合症、免疫缺陷综合症

品系描述

重组激活基因(recombination．activating genes，Rags)在V(D)J重组过程中发挥重要作用，V(D)J重组过程中发生的免疫球蛋白(Ig)基因和T细胞受体(TCR)基因的重排和重组是B细胞和T淋巴细胞成熟过程中的必需阶段。 小鼠的两个重组激活基因Rag1和Rag2均位于2号染色体，其编码的Rag1和Rag2蛋白在成熟前T细胞发育成为成熟T细胞以及成熟前B细胞发育成为成熟B细胞的过程中，通过识别Ig或TCR基因，并结合基因片段中的重组信号序列(RSS)，启动V(D)J重组。 Rag1和Rag2在淋巴细胞V(D)J重排过程中缺一不可，任意一个缺失都会导致T、B淋巴细胞发育中断，表现为严重的T／B细胞早期发育阻滞，T细胞停滞在CD3-CD4-CD8+CD25+阶段，B细胞停滞在B220-CD43+IgM-阶段，进而不能产生成熟的T、B淋巴细胞。因外周血中没有成熟T/B淋巴细胞，导致机体产生与人“重症联合免疫缺陷症”(severe combined immunodeficiency，SCID)类似的症状。 Rag1或者Rag2基因缺陷的小鼠外观发育正常，具有正常生殖能力，但由于不能产生T、B淋巴细胞，无法对异体来源的细胞产生异体排斥，因而可以作为移植瘤模型的载体。 在Rag1基因ATG位点定点敲入loxP-EGFP-PolyA-loxP-Neo-loxP表达框，从而造成Rag1基因沉默。作为Rag1基因敲除小鼠，皮下接种肝癌组织块和肿瘤细胞后能形成肿瘤，并且可以增长。由FACS检测小鼠外周静脉血中的T、B淋巴细胞生成量极低，与Nude小鼠T、B淋巴细胞产生量相当甚至更低，与野生型小鼠相比具有显著性差异。肿瘤组织HE染色病理切片结果显示Rag1 KO小鼠和Nude小鼠肿瘤切片较为相似。该品系小鼠具有替代Nude，NOD-SCID小鼠作为肿瘤成瘤模型的潜力。

应用领域：免疫缺陷，荷瘤模型

*使用本品系发表的文献需注明: Rag1-KO(Rag1-EGFP) mice (Cat. NO. NM-KI-00069) were purchased

from Shanghai Model Organisms Center, Inc..

验证数据

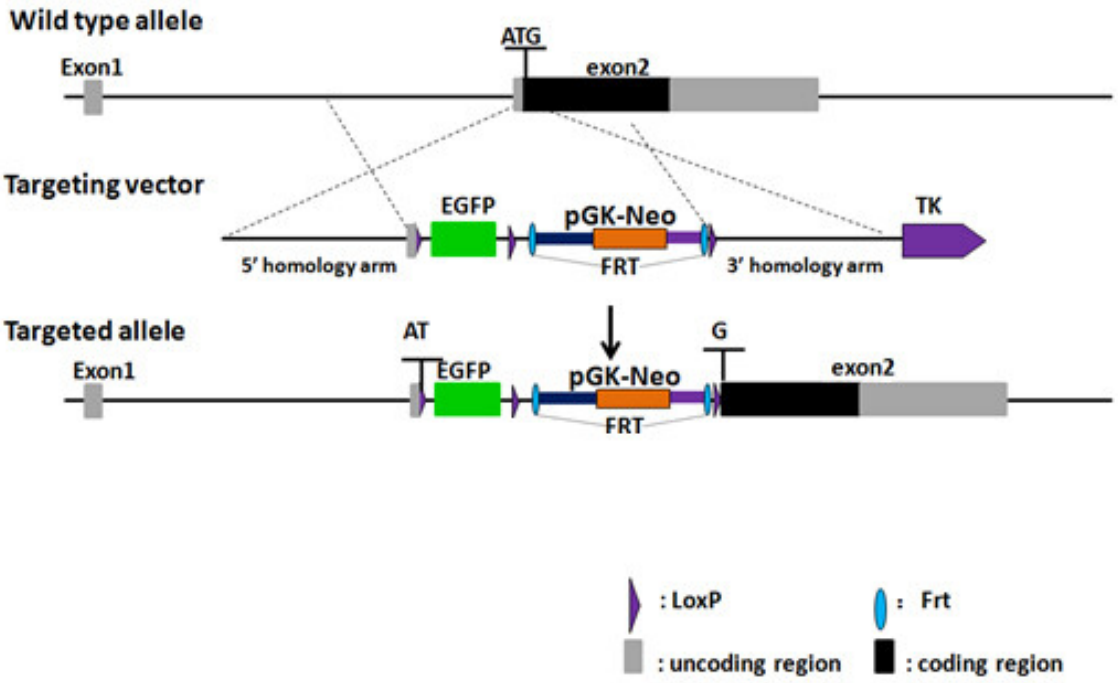

Fig.1 Construction strategy of Rag1-KO.

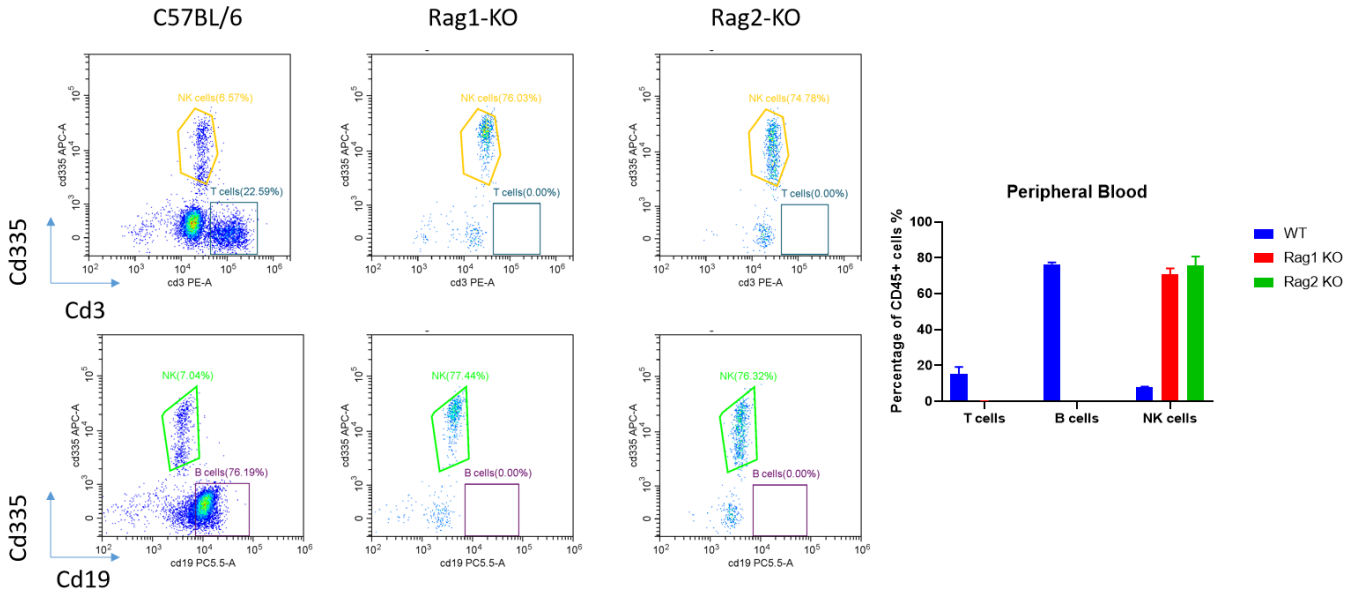

Fig.2 Loss of T and B cells in peripheral blood of Rag1-KO and Rag2-KO mice.

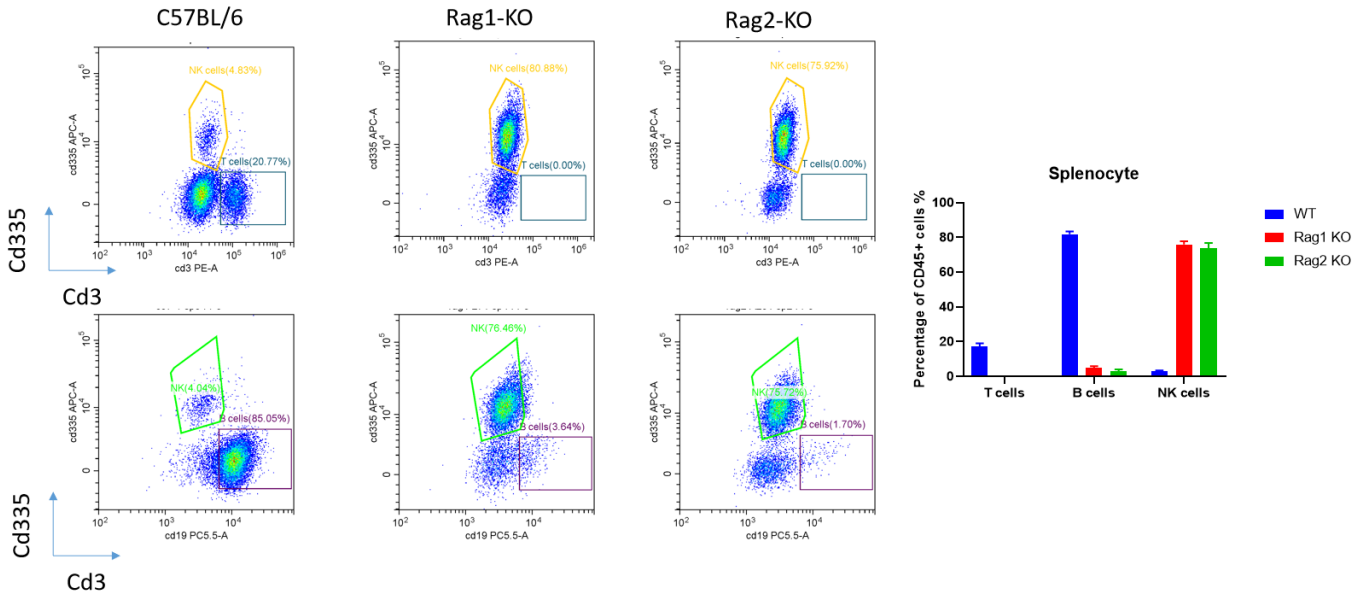

Fig.3 Loss of T and B cells in Spleen of Rag1-KO and Rag2-KO mice.

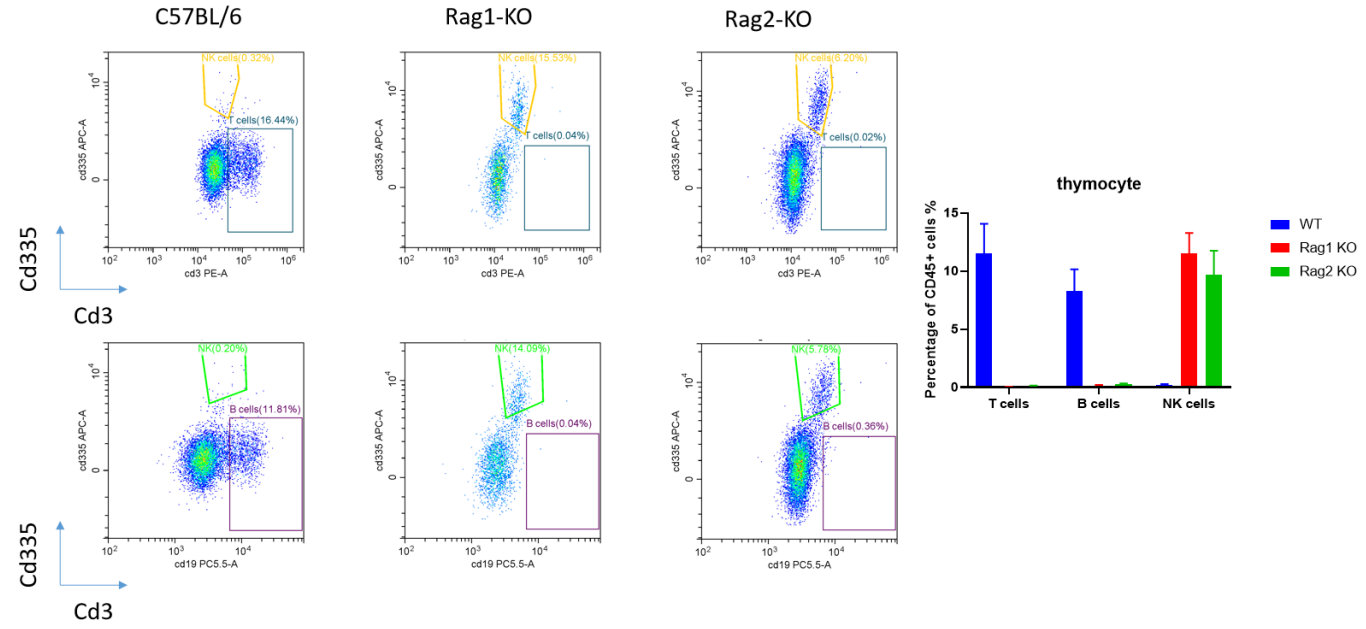

Fig.4 Loss of T and B cells in thymus of Rag1-KO and Rag2-KO mice.

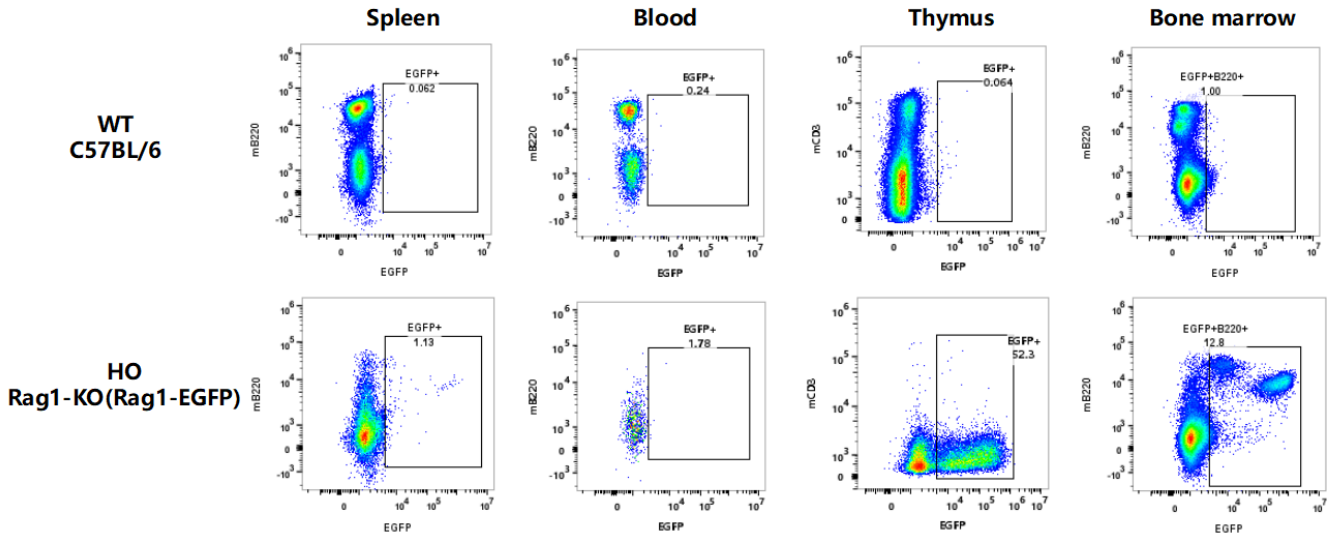

Fig.5 Detection of EGFP expression in CD45+ cells in spleen, blood, thymus, and bone marrow of 8.7-week-old female WT and HO Rag1-KO(Rag1-EGFP) mice.

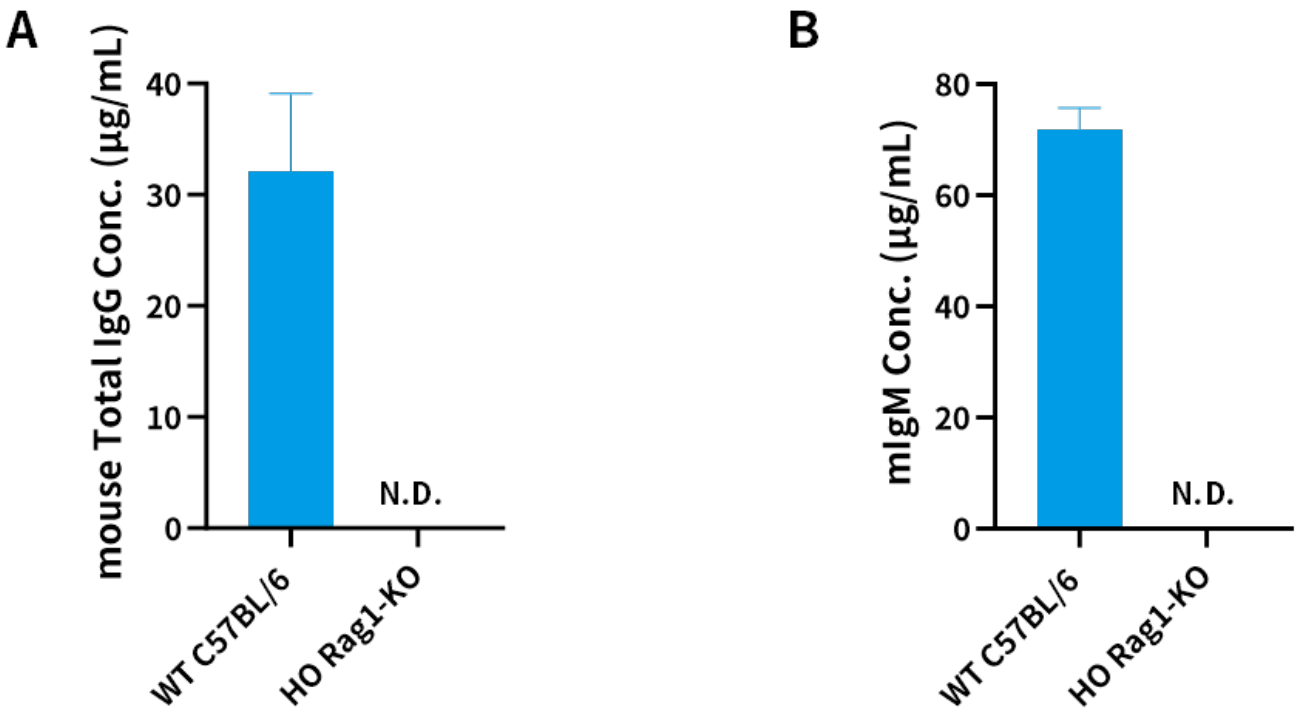

Fig.6 Detection of mouse IgG(A) and IgM(B) expression in serum by ELISA. (male, 5~6wks, n=3)

Abbr. HO, homozygous; WT, wild type; N.D. not detected.

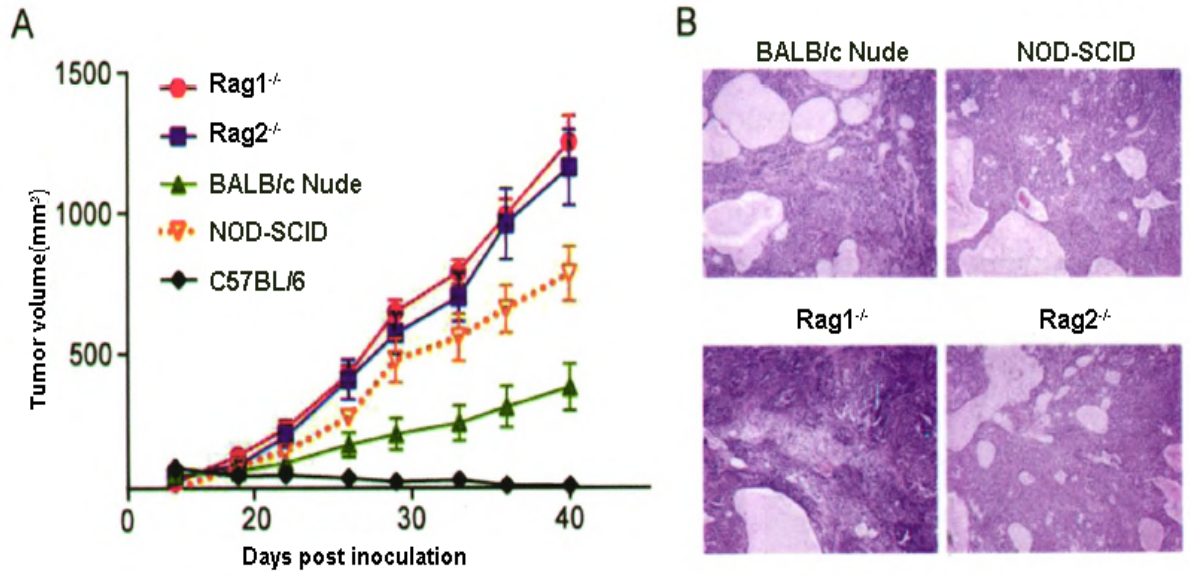

Fig.7 Tumorigenicity results following inoculation with A549 tumor cells in Balb/c nude, NOD-Scid, Rag1-KO and Rag2-KO mice.

Table1. Complete blood count of Rag1-KO (Rag1-EGFP) mice

Parameter	Units	Rag1-KO; Male	Rag1-KO; Female
		8-10 weeks; n=10	8-10 weeks; n=10
WBC	10^3 cells/μL	2.16±0.44	0.76±0.24
RBC	10^6 cells/μL	9.69±0.09	10.13±0.09
HGB	g/dL	14.34±0.13	15.10±0.12
HCT	%	46.78±0.37	48.36±0.20
MCV	fL	48.27±0.28	47.76±0.31
MCH	pg	14.81±0.08	14.90±0.03
MCHC	g/dL	30.67±0.10	31.23±0.17
PLT	10^6 cells/μL	2252.00±70.30	1573.78±77.11
RDW-SD	fL	32.10±0.49	29.20±0.23
RDW-CV	%	21.42±0.21	20.57±0.17
PDW	fL	7.47±0.11	7.37±0.13
MPV	fL	6.79±0.08	6.66±0.08
P-LCR	%	5.22±0.31	4.67±0.33
PCT	%	1.53±0.05	1.05±0.06
NEUT#	10^3 cells/μL	1.28±0.33	0.32±0.09
LYMPH#	10^3 cells/μL	0.57±0.06	0.34±0.12
MONO#	10^3 cells/μL	0.27±0.09	0.08±0.03
EO#	10^3 cells/μL	0.02±0.00	0.01±0.01
BASO#	10^3 cells/μL	0.02±0.01	0.01±0.01
NEUT%	%	54.72±4.84	46.99±5.04
LYMPH%	%	32.15±4.90	42.13±5.31
MONO%	%	11.24±1.19	8.79±1.27
EO%(%)	%	0.98±0.19	1.31±0.53
BASO%	%	0.91±0.51	0.78±0.39
RET#	10^6 cells/μL	0.50±0.01	0.53±0.03
RET%	%	5.19±0.10	5.25±0.33
LFR(%)	%	42.78±0.95	42.93±1.28
MFR(%)	%	24.65±0.66	25.69±0.52
HFR(%)	%	32.57±1.49	31.38±1.25
IRF(%)	%	57.22±0.95	57.07±1.28

Table 2. Serum biochemical analysis of Rag1-KO (Rag1-EGFP) mice.

Parameter	Units	Rag1-KO; Male	Rag1-KO; Female
		8-10 weeks; n=10	8-10 weeks; n=10
TP	g/L	54.00±1.25	57.11±1.65
ALB	g/L	25.50±0.50	27.17±1.11
ALP	U/L	469.00±13.76	806.78±15.20
ALT	U/L	69.50±8.31	44.17±16.91
AST	U/L	191.00±36.25	223.06±62.00
T-BIL	μmol/L	1.62±0.15	1.76±0.66
D-BIL	μmol/L	1.78±0.28	7.65±4.93
CHE	U/L	4143.50±148.13	6539.22±205.63
CRE	μmol/L	20.97±0.66	21.77±1.31
BUN	mmol/L	10.10±0.44	8.17±0.61
UA	μmol/L	311.60±41.33	120.06±5.81
TCHO	mmol/L	2.93±0.07	2.44±0.11
TG	mmol/L	1.04±0.06	0.39±0.05
HDL	mmol/L	2.62±0.11	2.12±0.22
LDL	mmol/L	1.92±0.03	2.25±0.16
NEFA	mmol/L	0.70±0.05	0.78±0.14
LDH	U/L	702.50±99.53	813.67±272.32
CK	U/L	1107.50±464.45	1915.67±500.47
Hcy	μmol/L	11.45±0.98	13.78±0.88
GLU	mmol/L	16.94±0.87	9.49±0.60
Ca	mmol/L	3.18±0.05	2.79±0.05
IP	mmol/L	4.20±0.13	3.31±0.11
Fe	μmol/L	38.35±1.20	36.66±2.64
CRP	mg/L	0.46±0.26	0.27±0.16

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Original research: Macrophage STING signaling promotes NK cell to suppress colorectal cancer liver metastasis via 4-1BBL/4-1BB co-stimulation
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