



铁稳态调节 与铁死亡

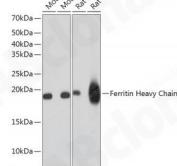
IRON HOMEOSTASIS & FERROPTOSIS
PATHWAY

铁死亡是一种依赖于铁离子的程序性细胞死亡形式，是由于多种因素（如药物或基因因素）造成代谢过程的变化和过氧化脂质的积累，使细胞膜结构受损而引起。铁死亡的起始和执行受到多种分子机制的调控，大致可分为几类：A) 铁稳态调节；B) 氧化还原调节；C) GSH稳态调节；D) 脂类代谢调节；E) 糖类代谢调节；F) 线粒体功能调节。铁死亡与肿瘤、神经退行性疾病（如阿尔茨海默病、亨廷顿氏症和帕金森病）、卒中、脑创伤疾病、多种内脏器官缺血再灌注损伤、肝纤维化和急性肾损伤等多种病理过程相关，在植物的热应激过程中也有涉及。

明星产品

A19544 Ferritin Rabbit mAb

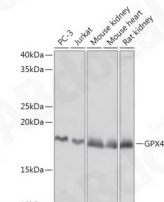
Applications:WB
Reactivity:Human,Mouse,Rat



Western blot analysis of extracts of various cell lines, using Ferritin Heavy Chain antibody (A19544) at 1:1000 dilution.

A11243 GPX4 Rabbit mAb

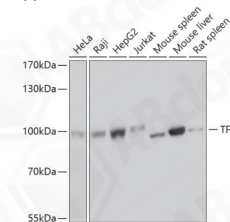
Applications:WB
Reactivity:Human,Mouse,Rat



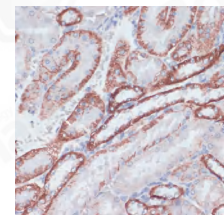
Western blot analysis of extracts of various cell lines, using GPX4 Rabbit mAb (A11243) at 1:1000 dilution.

A5865 TFRC Rabbit pAb

Applications:WB,IHC,IF
Reactivity:Human,Mouse,Rat



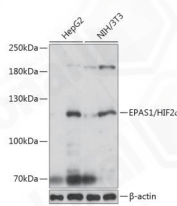
Western blot analysis of extracts of various cell lines, using TFRC antibody (A5865) at 1:3000 dilution.



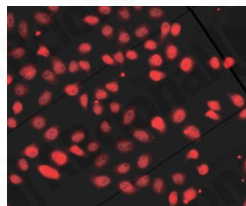
Immunohistochemistry of paraffin-embedded rat kidney using TFRC antibody (A5865) at dilution of 1:100 (40x lens).

A7553 HIF2a Rabbit pAb

Applications:WB,IF
Reactivity:Human,Mouse,Rat



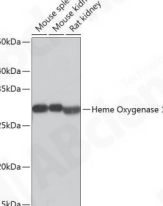
Western blot analysis of extracts of various cell lines, using EPAS1/HIF2a antibody (A7553) at 1:1000 dilution.



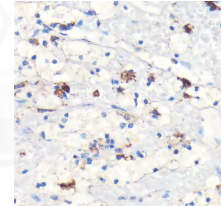
Immunofluorescence analysis of A549 cells using HIF2a antibody (A7553).

A19062 Heme Oxygenase 1 Rabbit mAb

Applications:WB,IHC
Reactivity:Human,Mouse,Rat



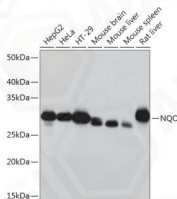
Western blot analysis of extracts of various cell lines, using Heme Oxygenase 1 antibody (A19062) at 1:500 dilution.



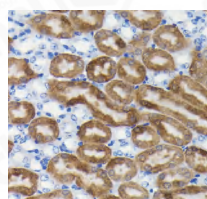
Immunohistochemistry of paraffin-embedded human kidney cancer using Heme Oxygenase 1 Rabbit mAb (A19062) at dilution of 1:100 (40x lens).

A19586 NQO1 Rabbit mAb

Applications:WB,IHC
Reactivity:Human,Mouse,Rat



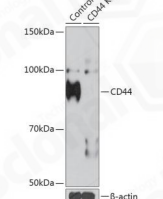
Western blot analysis of extracts of various cell lines, using NQO1 antibody (A19586) at 1:1000 dilution.



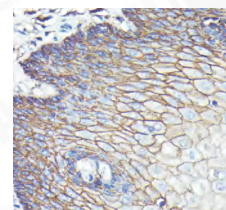
Immunohistochemistry of paraffin-embedded mouse kidney using NQO1 antibody (A19586) at dilution of 1:100 (40x lens).

A19020 [KO Validated] CD44 Rabbit mAb

Applications:WB,IHC
Reactivity:Human



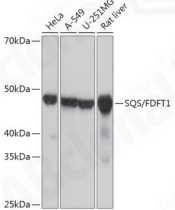
Western blot analysis of extracts from normal (control) and CD44 knockout (KO) HeLa cells, using CD44 antibody (A19020) at 1:1000 dilution.



Immunohistochemistry of paraffin-embedded human esophageal tissue using CD44 Rabbit mAb (A19020) at dilution of 1:100 (40x lens).

A4651 FDFT1 Rabbit mAb

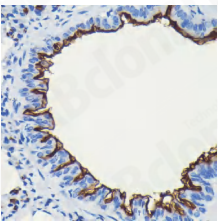
Applications:WB
Reactivity:Human,Mouse,Rat



Western blot analysis of extracts of various cell lines, using SQS/FDFT1 Rabbit mAb (A4651) at 1:1000 dilution.

A19081 MUC1 Rabbit mAb

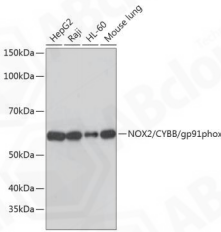
Applications:WB,IHC
Reactivity:Human,Mouse,Rat



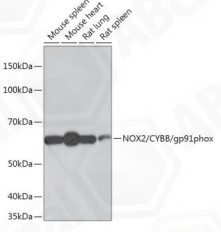
Immunohistochemistry of paraffin-embedded mouse lung using MUC1 Rabbit mAb (A19081) at dilution of 1:100 (40x lens).

A19701 NOX2/CYBB/gp91phox Rabbit mAb

Applications:WB Reactivity:Human,Mouse,Rat



Western blot analysis of extracts of various cell lines, using NOX2/CYBB/gp91phox antibody (A19701) at 1:1000 dilution.



Western blot analysis of extracts of various cell lines, using NOX2/CYBB/gp91phox antibody (A19701) at 1:1000 dilution.

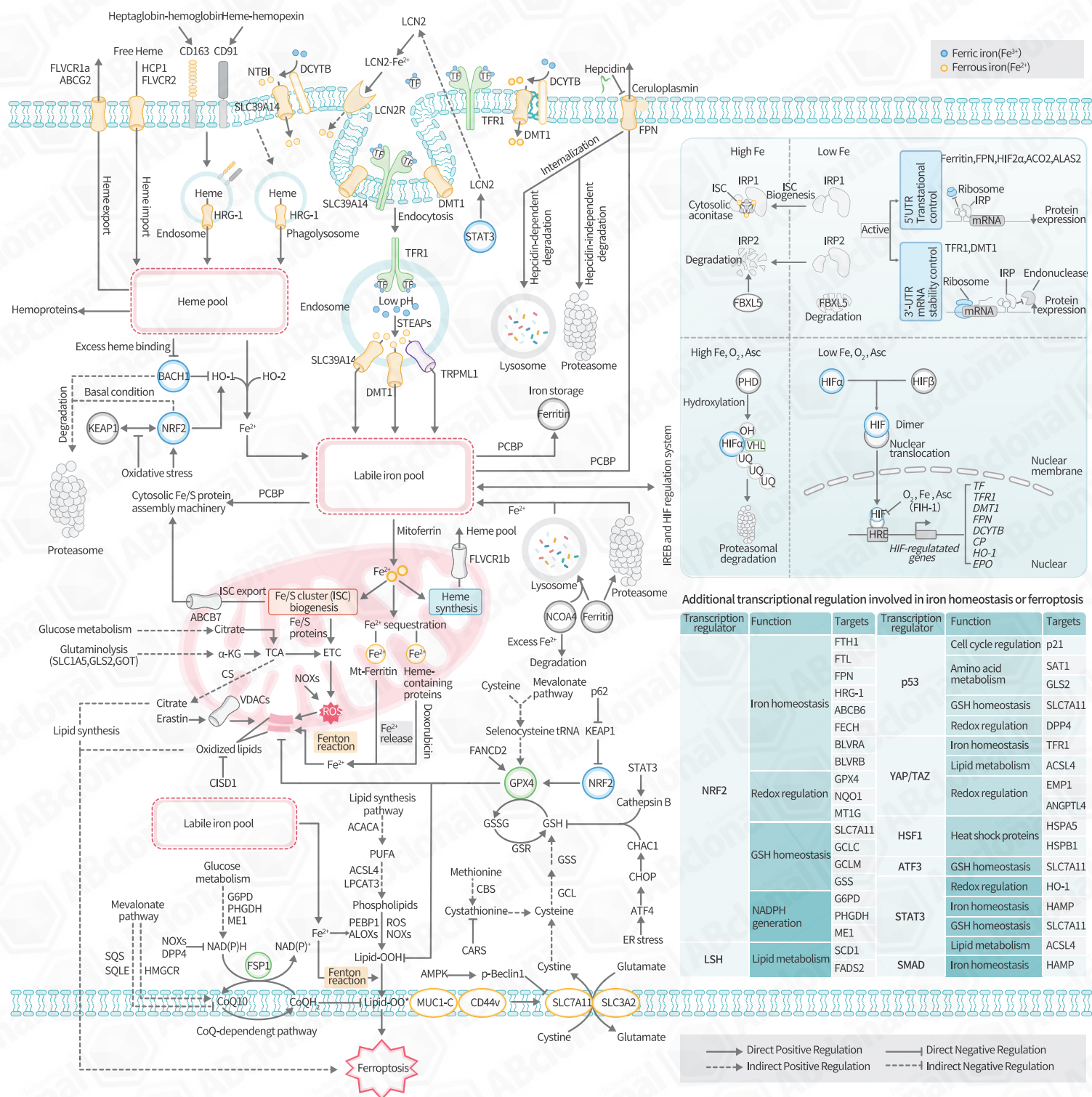
铁稳态调节与铁死亡信号通路精选研究产品

分类	研究靶点	产品货号	产品名称	应用	反应种属
铁离子摄入与排出	TFRC	A5865	TFRC Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	TfR2	A9845	TFR2 Rabbit pAb	WB	Mouse
	ZIP14	A10413	SLC39A14 Rabbit pAb	WB	Human
	DMT1	A10231	SLC11A2 Rabbit pAb	WB	Human,Mouse,Rat
	STEAP3	A0683	STEAP3 Rabbit pAb	WB	Human,Mouse
	Ceruloplasmin	A7658	CP Rabbit pAb	WB,IF	Human,Mouse,Rat
	Hepcidin	A1601	HAMP Rabbit pAb	WB	Human,Mouse
铁离子伴侣蛋白	PCBP1	A1044	PCBP1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	PCBP2	A2531	PCBP2 Rabbit pAb	WB,IHC,IF	Human,Mouse,Zebrafish
铁离子储存	FTH1	A19544	Ferritin Rabbit mAb	WB	Human,Mouse,Rat
	FTL	A11241	Ferritin Light Chain mAb	WB, IHC	Human, Mouse, Rat
铁离子调节蛋白	IRP1	A6008	ACO1 Rabbit pAb	WB,IHC	Mouse,Rat
	IRP2	A6382	IREB2 Rabbit pAb	IF	Human
	FBXL5	A5602	FBXL5 Rabbit pAb	WB,IHC	Human,Mouse,Rat
铁自噬	NCOA4	A5695	[KO Validated] NCOA4 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
转录因子	HIF	A16873	HIF1A Rabbit pAb	WB,IHC	Human,Mouse,Rat
		A19532	HIF-1 beta Rabbit mAb	WB,IHC	Human
		A7553	HIF2a Rabbit pAb	WB,IF	Human,Mouse,Rat
	PHD/EGLN1	A14557	[KO Validated] EGLN1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	NRF2	A11159	NRF2 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	BACH1	A5393	BACH1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	HSF1	A13765	HSF1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	p53	A10610	p53 Mouse mAb	WB,IHC,IF	Human
		A5761	p53 Rabbit pAb	WB,IP,IHC,ChIP	Human,Mouse,Rat
	ATF3	A13469	ATF3 Rabbit pAb	WB,IF	Human,Mouse,Rat
	ATF4	A0201	ATF4 Rabbit pAb	WB,IF	Human
	CHOP	A0221	DDIT3 / CHOP Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	YAP	A19134	YAP1 Rabbit mAb	WB,IHC,IF	Human
		A1002	[KO Validated] YAP1 Rabbit pAb	WB,IP,IHC,IF	Human,Mouse,Rat
	TAZ	A12722	Tafazzin / TAZ Rabbit pAb	WB	Human,Mouse,Rat
	ZEB1	A5600	ZEB1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
氧化还原调节	STAT3	A19566	[KO Validated] STAT3 Rabbit mAb	WB	Human, Mouse, Rat
		A11192	[KO Validated] STAT3 Rabbit pAb	WB, IHC, IF	Human, Mouse, Rat
	GPX4	A11243	GPX4 Rabbit mAb	WB, IHC	Human, Mouse, Rat
	FSP1/AIFM2	A12128	AIFM2 Rabbit pAb	WB	Human
	CISD1	A10317	CISD1 Rabbit pAb	WB,IHC	Human,Mouse,Rat

铁稳态调节与铁死亡信号通路精选研究产品

分类	研究靶点	产品货号	产品名称	应用	反应种属
氧化还原调节	NQO1	A19586	NQO1 Rabbit mAb	WB,IHC	Human,Mouse,Rat
	HO-1	A19062	Heme Oxygenase 1 Rabbit mAb	WB,IHC	Human,Mouse,Rat
	NFS1	A6688	NFS1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	ALOXs	A2158	ALOX5 Polyclonal Antibody	WB,IHC,IF	Human,Mouse,Rat
		A16210	ALOX12B Rabbit pAb	WB	Human,Mouse
		A6865	ALOX15B Rabbit pAb	WB,IF	Human,Mouse
	PEBP1	A12768	PEBP1 Rabbit mAb	WB	Human, Mouse, Rat
	DPP4/CD26	A4252	CD26 Rabbit mAb	WB	Human,Mouse,Rat
	NOXs	A8527	NOX1 Polyclonal Antibody	WB	Human
		A19701	NOX2/CYBB/gp91phox Rabbit mAb	WB	Human,Mouse,Rat
		A11274	NOX4 Polyclonal Antibody	WB	Human,Mouse
GSH 稳态调节	SLC7A11	A2413	SLC7A11 / xCT Rabbit mAb	WB	Human, Mouse, Rat
	Beclin 1	A7353	[KO Validated] Beclin 1 Rabbit pAb	WB,IHC,IF, IP	Human,Mouse,Rat
	CD44	A19020	[KO Validated] CD44 Rabbit mAb	WB, IHC	Human
	MUC1	A19081	MUC1 Rabbit mAb	WB,IHC	Human,Mouse,Rat
	GCLC	A4499	GCLC Rabbit mAb	WB,IHC	Human,Rat
	GCLM	A13989	GCLM Rabbit pAb	WB,IHC	Human,Mouse
	GSS	A14535	[KO Validated] GSS Rabbit pAb	WB	Human,Mouse,Rat
	CBS	A11612	CBS Rabbit mAb	WB,IHC	Human,Rat
	ABCC1	A11153	ABCC1 Rabbit pAb	WB,IHC	Human,Mouse,Rat
	SLC1A5	A6981	SLC1A5 Rabbit pAb	WB	Human
	GLS2	A16029	GLS2 Rabbit pAb	WB,IF	Human,Mouse,Rat
	SAT1	A2506	SAT1 Rabbit pAb	WB	Human,Mouse,Rat
	GOT1	A5822	GOT1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	CARS	A6540	CARS Rabbit pAb	WB,IHC,IF	Human,Mouse
	CHAC1	A15584	CHAC1 Rabbit pAb	WB	Human
脂类代谢调节	LSH	A5831	[KO Validated] HELLS Rabbit pAb	WB,IHC,IP	Human,Mouse,Rat
	SCD	A16429	[KO Validated] SCD Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	FADS2	A10270	FADS2 Rabbit pAb	WB	Human,Mouse
	ACSL3	A11679	ACSL3 Rabbit pAb	WB,IHC	Human,Mouse,Rat
	ACSL4	A16848	ACSL4 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	LPCAT3	A17604	LPCAT3 Rabbit pAb	WB	Mouse,Rat
	CS	A5713	CS Rabbit pAb	WB,IF	Human,Mouse,Rat
	ACACA	A15606	ACACA Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
甲羟戊酸(MVA)途径	HMGCR	A19063	HMGCR Rabbit mAb	WB	Human,Mouse,Rat
	SQS/FDFT1	A4651	FDFT1 Rabbit mAb	WB	Human,Mouse,Rat
	SQLE	A2428	SQLE Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
糖类代谢调节	PHGDH	A19974	[KO Validated] PHGDH Rabbit pAb	WB,IHC	Human,Mouse,Rat
	G6PD	A11234	G6PD Rabbit mAb	WB	Human
	ME1	A3956	ME1 Rabbit pAb	WB	Human,Mouse,Rat
	PHKG2	A14040	PHKG2 Rabbit pAb	WB	Human,Mouse,Rat
热休克蛋白	GRP78/BiP	A0241	GRP78/BiP Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
	HSPB1	A16332	[KO Validated] HSPB1 Rabbit pAb	WB,IHC,IF	Human,Mouse,Rat
DNA 损伤相关	FANCD2	A18055	[KO Validated] FANCD2 Rabbit pAb	WB,IF	Human
线粒体功能调节	VDAC1	A19707	VDAC1 Rabbit mAb	WB,IHC,IF	Human,Mouse,Rat
	VDAC2	A18683	VDAC2 Rabbit pAb	WB	Human,Mouse,Rat
	VDAC3	A10544	VDAC3 Rabbit pAb	WB,IF	Human

铁稳态调节与铁死亡信号通路



铁死亡是一种铁依赖的程序性细胞死亡，其原因是代谢过程的改变和脂质过氧化的积累，对膜结构具有毒性和破坏性。铁死亡的起始和执行处于氨基酸、脂类、糖类和铁代谢的交叉点，铁死亡的敏感性受到多种机制的调节，包括：A) GSH和氧化还原稳态调节，如xCT系统、GPX4调节、FSP1-CoQ10-NAD(P)H途径、硫转移途径、甲羟戊酸(MVA)途径、谷氨酰胺代谢途径、NRF2和p53调节轴；B) 铁稳态的调节，如ATG5-ATG7-NCOA4通路、IREB调节系统和热休克蛋白的调节；C) 糖类和脂类代谢相关酶，如PHGDH、G6PD、ACSL4和LPCAT3等。D) 线粒体的功能调节，如VDAC、线粒体电子传递链(ETC)和TCA循环。

感谢浙江大学医学院王福倬教授团队和闵军霞教授团队（营养发现创新中心）以及浙江大学呼吸疾病研究所陈志华研究员对本图绘制过程中给予的关心和帮助，很多修订建议帮助我们极大的完善了本图的科学性和准确性。

其他铁死亡研究相关试剂

产品分类	产品货号	产品名称	用途
铁死亡抑制剂	RM02804	Ferrostatin-1 (Fer-1)	通过抑制脂质氧化抑制铁死亡，常用铁死亡抑制剂
铁死亡抑制剂	RM02805	Liproxstatin-1	通过抑制脂质氧化抑制铁死亡，常用铁死亡抑制剂
铁死亡抑制剂	RM02806	Liproxstatin-1 HCl	通过抑制脂质氧化抑制铁死亡，常用铁死亡抑制剂
铁死亡抑制剂	RM02807	Deferoxamine mesylate	通过抑制脂质氧化抑制铁死亡
铁死亡抑制剂	RM02808	Zileuton	5-脂氧合酶（5-LOX）抑制剂
铁死亡抑制剂	RM02809	BHT	通过抑制脂质氧化抑制铁死亡
生化分析试剂	RM02821	C11 BODIPY 581/591 脂质过氧化荧光探针	脂质过氧化测定
生化分析试剂	RM02822	MitoSOX Red Mitochondrial Superoxide Indicator 线粒体超氧化物红色荧光探针	线粒体超氧化物测定
生化分析试剂	RM02823	CCK-8 试剂盒	细胞存活测定

中国

- 中国总部： 武汉市东湖新技术开发区高新二路388号光谷国际生物医药企业加速器一期7栋4层
- 武汉分部： 武汉市洪山区珞狮路融科珞瑜中心 T1公寓2302室
- 上海分部： 上海市浦东新区张江镇盛荣路88弄盛大源创谷5号楼902室
- 北京分部： 北京市朝阳区北沙滩甲一号中科电大厦702室
- 南京分部： 江苏省南京市玄武区珠江路88号2幢新世界中心B座1109室
- 成都分部： 成都市武侯区人民南路三段17号华西美庐A栋16层1602室
- 杭州分部： 杭州市西湖区古墩路616号同人精华大厦2号楼422室
- 厦门分部： 福建省厦门市翔安区新店镇沙美路鹊峰南里201-1-102号



20201130.1.2