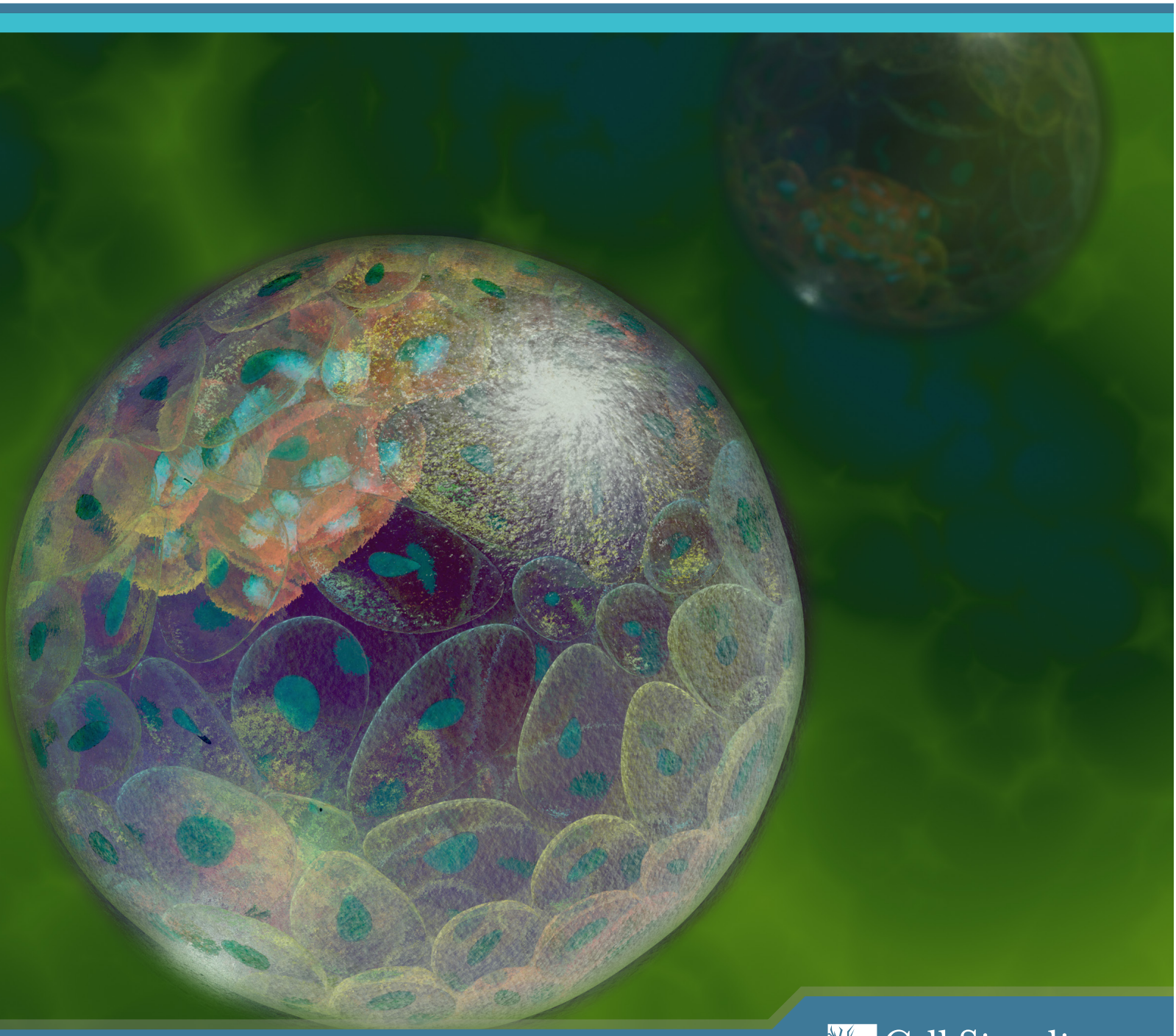
RESEARCH FOCUS

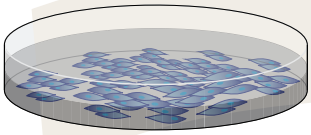
iPS and Embryonic Stem Cell Markers



Cell Signaling TECHNOLOGY®

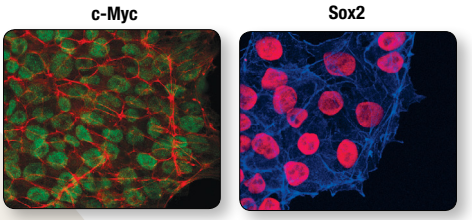
Pluripotency

is the ability of a cell to differentiate into cell types of the three germ layers, the endoderm, ectoderm and mesoderm, and eventually into any type of cell in an adult body. The ability to induce pluripotency in cells from an individual provides a valuable tool for developmental biology studies and disease research studies, and could ultimately be applied to personalized stem cell therapy. Cell Signaling Technology (CST) offers a comprehensive line of stem cell and lineage markers. CST™ antibodies are extensively validated in relevant applications by our team of in-house experts and validation data is presented online for each product. And our technical support scientists are available for consultation, just in case you need a partner at the bench.



Cultured cells or Patient Samples

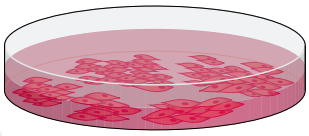
Reprogramming Factors

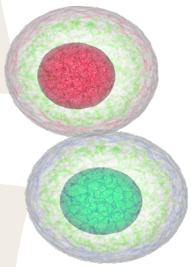


Species	Cell Type	Reprogramming Factors	Reference
Mouse	Fibroblasts	OKSM, OKS, OSE, KSNr	Takahashi & Yamanaka 2006
	Mature B & T cells	OKSMC, OKSM	Hanna et al. 2008; Eminli et al. 2009
	Myeloid progenitors	OKSM	Eminli et al. 2009
	Hematopoietic stem cells	OKSM	Eminli et al. 2009
	Adipose-derived stem cells	OKSM	Sugii et al. 2010
	Dermal Papilla	OKM, OK	Tsai et al. 2010
	Satellite cells	OKSM	Tan et al. 2011
	Pancreatic β-cells	OKSM	Stadtfeld et al. 2008
	Hepatic endoderm	OKS	Aoi et al. 2008
	Neural stem cells	OK	Kim et al. 2008; Kim et al. 2009
	Melanocytes	OKM	Utikal et al. 2009
Human	Fibroblasts	OKSM, OSLN, OKS	Takahashi et al. 2007; Yu et al. 2007; Nakagawa et al. 2008
	Mobilized peripheral blood	OKSM	Loh et al. 2009
	Cord blood endothelia	OSLN	Haase et al. 2009
	Cord blood stem cells	OKSM, OS	Eminli et al. 2009; Giorgetti et al. 2009
	Adipose-derived stem cells	OKSM, OKS	Sugii et al. 2010; Aoki et al. 2010
	Hepatocytes	OKSM	Liu et al. 2010
	Keratinocytes	OKSM, OKS	Aasen et al. 2008
	Neural stem cells	O	Kim et al. 2009
	Pancreatic β-cells	OKSM	Bar-Nur et al. 2011
	Amniotic cells	OKSM, OSN	Li et al. 2009; Zhao et al. 2010

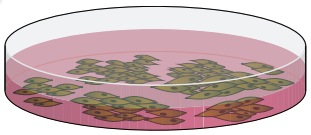
Reprogramming factors for mouse and human cells. Factors: O-Oct-4, K-Klf4, S-Sox2, M-c-Myc, E-Esrrb, Nr-Nr5a2, C-C/EBPα, L-Lin28, N-Nanog. Adapted from Walsh, Becker, and Hochedlinger 2011.

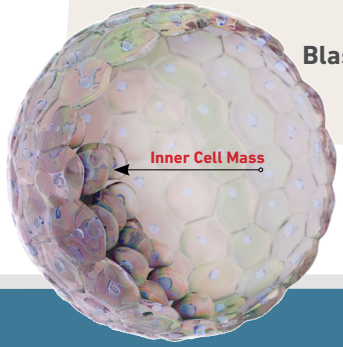
Induced Pluripotent Stem Cells





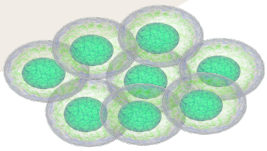
Culture Embryonic Stem Cells





Blastocyst

Pluripotent Inner Cell Mass



Common Pluripotency Markers

Oct-4: Transcription factor expressed in undifferentiated pluripotent embryonic stem cells and germ cells during normal development. Together with Sox2 and Nanog, is necessary for the maintenance of pluripotent potential.

Sox2: Transcription factor expressed in undifferentiated pluripotent embryonic stem cells and germ cells during development. Together with Oct-4 and Nanog, is necessary for the maintenance of pluripotent potential.

Nanog: Homeodomain-containing transcription factor essential for maintenance of pluripotency and self renewal in embryonic stem cells. Expression is controlled by a network of factors including Sox2 and the key pluripotency regulator Oct-4.

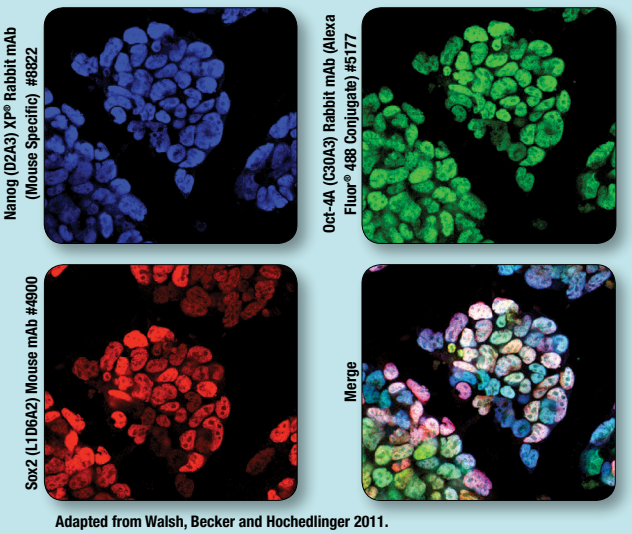
KLF4: Zinc-finger-containing transcription factor Krüppel-like factor 4 (KLF4); used for generation of human and mouse ES cells.

TRA-1-60/TRA-1-81/TRA-2-54: Present on the surface of human stem, teratocarcinoma, and embryonic germ cells.

SSEA1: Lactoseries oligosaccharide expressed on the surface of mouse embryonic carcinoma, embryonic stem, and germ cells, but only expressed on human germ cells. Expression of SSEA1 on human cells increases upon differentiation, while differentiation of mouse cells leads to decreased expression.

SSEA4: Glycolipid carbohydrate expressed on the surface of human teratocarcinoma stem, embryonic germ, and embryonic stem cells. Expression of human SSEA4 decreases following differentiation of human embryonic carcinoma cells, but increases following differentiation in mouse cells.

Immunofluorescent analysis of mouse iPS Cells



Adapted from Walsh, Becker and Hochedlinger 2011.

Common iPS and Stem Cell Markers

			Applications	Reactivity
New	12173	KLF4 (D1F2) Rabbit mAb	W, IP	H, (Mk)
	4038	KLF4 Antibody	W	H, M, Mk
	3695	LIN28A (D84C11) XP® Rabbit mAb	W, IF-IC, F	H, (R, Mk)
	8641	LIN28A (D1A1A) XP® Rabbit mAb	W, IF-IC, F	H, M, (R, Mk)
New	12573	LIN28A (D1A1A) XP® Rabbit mAb (Alexa Fluor® 488 Conjugate)	IF-IC, F	H, M, (R, Mk)
	11845	LIN28A (D1A1A) XP® Rabbit mAb (Alexa Fluor® 647 Conjugate)	IF-IC, F	H, M, (R, Mk)
New	8706	LIN28A (D9F5) Rabbit mAb	W, IP, IF-IC	H, M, (R, Mk)
	5930	LIN28A (6D1F9) Mouse mAb	W, IF-IC	H
	3978	LIN28A (A177) Antibody	W, IF-IC, F	H, M, (Mk)
	3979	LIN28A (P22) Antibody	W	H, (Mk)
New	11965	LIN28B (D4H1) Rabbit mAb	W, IP	H
	4196	LIN28B Antibody	W, IP	H
	5422	LIN28B Antibody (Mouse Preferred)	W	M, (R)
	4903	Nanog (D73G4) XP® Rabbit mAb	W, IHC-P, IF-IC, F	H, (Mk)
New	8750	Nanog (D73G4) XP® Rabbit mAb (Alexa Fluor® 594 Conjugate)	IF-IC	H, (Mk)
	5448	Nanog (D73G4) XP® Rabbit mAb (Alexa Fluor® 647 Conjugate)	IF-IC, F	H, (Mk)
	5232	Nanog (D73G4) XP® Rabbit mAb (ChIP Formulated)	ChIP	H
New	8822	Nanog (D2A3) XP® Rabbit mAb (Mouse Specific)	W, IP, IF-IC, F, ChIP	M
New	8785	Nanog (D1G10) Rabbit mAb (Mouse Specific; ChIP Formulated)	IP, ChIP	M
	3580	Nanog Antibody	W, IF-IC, F, ChIP	H
New	8600	Nanog Antibody (Mouse Specific)	W	M
	4893	Nanog (1E6C4) Mouse mAb	W, IHC-P, IF-IC, F	H
	2890	Oct-4A (C52G3) Rabbit mAb	W, IHC-P, IF-IC, F, ChIP	H
	2840	Oct-4A (C30A3) Rabbit mAb	W, IF-IC, F	H, M
	5177	Oct-4A (C30A3) Rabbit mAb (Alexa Fluor® 488 Conjugate)	IF-IC, F	H, M
New	4439	Oct-4A (C30A3) Rabbit mAb (Alexa Fluor® 555 Conjugate)	IF-IC	H, M
	5263	Oct-4A (C30A3) Rabbit mAb (Alexa Fluor® 647 Conjugate)	IF-IC, F	H, M
	5677	Oct-4A (C30A3C1) Rabbit mAb (ChIP Formulated)	ChIP	H, M
	2750	Oct-4 Antibody	W, IHC-P, IF-IC, F, ChIP	H, (Mk)
	2788	Oct-4 (V241) Antibody	W	H, M, (Mk)
	4286	Oct-4 (9B7) Mouse mAb	W, IP	H, M
	9539	PathScan® Total Oct-4A Sandwich ELISA Kit	ELISA	H
	3579	Sox2 (D6D9) XP® Rabbit mAb	W, IHC-P, IF-IC, F	H, (Mk, B, Dg, Hr)
	5049	Sox2 (D6D9) XP® Rabbit mAb (Alexa Fluor® 488 Conjugate)	IF-IC, F	H, (Mk, B, Dg, Hr)
	5179	Sox2 (D6D9) XP® Rabbit mAb (Alexa Fluor® 555 Conjugate)	IF-IC	H, (Mk, B, Dg, Hr)
New	7685	Sox2 (D6D9) XP® Rabbit mAb (Alexa Fluor® 594 Conjugate)	IF-IC	H, (Mk, B, Dg, Hr)
	5067	Sox2 (D6D9) XP® Rabbit mAb (Alexa Fluor® 647 Conjugate)	IF-IC, F	H, (Mk, B, Dg, Hr)
	5024	Sox2 (D6D9) XP® Rabbit mAb (ChIP Formulated)	ChIP	H, (Mk, B, Dg, Hr)
	3728	Sox2 (C70B1) Rabbit mAb (IHC Preferred)	W, IHC-P	M
	2748	Sox2 Antibody	W, IP, ChIP	H, M, (R, Mk, B, Dg, Hr)
	4195	Sox2 (L73B4) Mouse mAb	W	H, M, (Mk, B, Dg, Hr)
	4900	Sox2 (L1D6A2) Mouse mAb	W, IF-IC, F	H, M, (R, B, Dg, Hr)
	7277	PathScan® Total Sox2 Sandwich ELISA Kit	ELISA	H
	4744	SSEA1 (MC480) Mouse mAb	IHC-P, IF-IC, F	M
	4755	SSEA4 (MC813) Mouse mAb	IF-IC, F	H
	4746	TRA-1-60(S) (TRA-1-60(S)) Mouse mAb	W, IHC-P, IF-IC, F	H
	4745	TRA-1-81 (TRA-1-81) Mouse mAb	IHC-P, IF-IC, F	H
	4747	TRA-2-54 (2J) Mouse mAb	W, IP	H

Stem Cell Kits

9094	StemLight™ Pluripotency Surface Marker Antibody Kit
9093	StemLight™ Pluripotency Transcription Factor Antibody Kit
9656	StemLight™ Pluripotency Antibody Kit
9092	StemLight™ iPS Cell Reprogramming Antibody Kit

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Epigenetic Regulators and Marks

Histone Modifications

			Applications	Reactivity
	8173	Acetyl-Histone H3 (Lys27) (D5E4) XP® Rabbit mAb	W, IF-IC, ChIP	H, M, R, Mk, (Hm, X, Z, GP, Hr)
	9649	Acetyl-Histone H3 (Lys9) (C5B11) Rabbit mAb	W, IP, IHC-P, IF-IC, F, ChIP	H, M, R, Mk, Z, Ce, (Sc)
	5326	Mono-Methyl-Histone H3 (Lys4) (D1A9) XP® Rabbit mAb	W, IF-IC, ChIP	H, M, R, Mk, (Dm)
	9725	Di-Methyl-Histone H3 (Lys4) (C64G9) Rabbit mAb	W, IP, IHC-P, IF-IC, ChIP	H, M, R, Mk
	9751	Tri-Methyl-Histone H3 (Lys4) (C42D8) Rabbit mAb	W, IHC-P, IF-IC, ChIP	H, M, R, Mk, Dm, Sc, (X, Z)
	7538	Mono-Methyl-Histone H3 (Lys9) Antibody	W	H, M, R, Mk, (X, Z, Pg, Sc, Hr)
	4658	Di-Methyl-Histone H3 (Lys9) (D85B4) XP® Rabbit mAb	W, IP, IF-IC, ChIP	H, M, R, Mk, (Dm, X, Z, B, Pg, Sc, Ce)
	9753	Di-Methyl-Histone H3 (Lys9) Antibody	W, IP, IHC-P, IF-IC, ChIP	H, M, R, Mk, Dm, Sc
	5327	Di/Tri-Methyl-Histone H3 (Lys9) (6F12) Mouse mAb	W, IP, IF-IC, ChIP	H, M, R, Mk
	4473	Pan-Methyl-Histone H3 (Lys9) (D54) XP® Rabbit mAb	W, IP, IF-IC, ChIP	H, M, R, Mk, (C, Dm, X, Z, B, Pg, Sc, Ce)
	7693	Mono-Methyl-Histone H3 (Lys27) Antibody	W	H, M, R, Mk, (Hm, X, Z, Hr)
	9728	Di-Methyl-Histone H3 (Lys27) (D18C8) XP® Rabbit mAb	W, IF-IC, ChIP	H, M, R, Mk
	9733	Tri-Methyl-Histone H3 (Lys27) (C36B11) Rabbit mAb	W, IP, IHC-P, IF-IC, ChIP	H, M, R, Mk, (X, Z)
	12455	MacroH2A1.1 (D5F6N) Rabbit mAb	W, IF-IC	H, M, R
	8240	Ubiquityl-Histone H2A (Lys119) (D27C4) XP® Rabbit mAb	W, IP, ChIP	H, M, R, Mk

Histone Modifying Enzymes

			Applications	Reactivity
New	12354	ARID1A/BAF250A (D2A8U) Rabbit mAb	W, IHC-P	H, M, R, Mk
	5019	ASH2L (D93F6) XP® Rabbit mAb	W, IP, IF-IC	H, M, R, Mk, (Dm)
	6964	Bmi1 (D20B7) XP® Rabbit mAb	W, IP, IHC-P, IF-IC, ChIP	H, Mk
	5856	Bmi1 (D42B3) Rabbit mAb	W, IP, IF-IC, ChIP	H, M, R, Mk
	3508	Brg1 (A52) Antibody	W, IF-IC	H, M, Mk, (R)
New	11966	BRM (D9E8B) XP® Rabbit mAb	W, IP, IF-IC, ChIP	H, Mk, (Dg)
New	7389	CBP (D6C5) Rabbit mAb	W, IP, IF-IC, ChIP	H, M, R, Mk
New	7425	CBP (D9B6) Rabbit mAb	W, IP, ChIP	H, M, R, Mk
New	4351	CHD1 (D8C2) Rabbit mAb	W, IP, ChIP	H, M, R, Mk, (B, Dg, Pg)
	3417	CTCF (D1A7) XP® Rabbit mAb	W, IP, IF-IC, ChIP	H, R, Mk, (B)
	3418	CTCF (D31H2) XP® Rabbit mAb	W, IP, IHC-P, IF-IC, ChIP	H, M, R, Mk, (B, Hr)
	5032	DNMT1 (D63A6) XP® Rabbit mAb	W, IF-IC	H, M, R, Mk, (Hm, B, Dg, GP, Hr)
	5119	DNMT1 (D59A4) Rabbit mAb	W	H, M, R, Mk, (B)
	3598	DNMT3A (D23G1) Rabbit mAb	W, IP	H, M, R, Mk, B, (Hm, Dg, Pg, Hr)
	2160	DNMT3A Antibody	W, IP	H, M, R, Mk, (B)
New	12309	DNMT3L Antibody (Mouse Specific)	W, IP	M
	2196	ESET (C1C12) Rabbit mAb	W, IP, IF-IC	H, Mk
	5246	Ezh2 (D2C9) XP® Rabbit mAb	W, IP, IHC-P, IF-IC, ChIP	H, M, R, Mk
	3147	Ezh2 (AC22) Mouse mAb	W, IF-IC	H, M, R, Mk
	4905	Ezh2 Antibody	W, IP, ChIP	H, M, R, Pg
	3306	G9a/EHMT2 (C6H3) Rabbit mAb	W, IF-IC	H, M, R, Mk, (B, Pg, Hr)
	5356	HDAC1 (10E2) Mouse mAb	W, IP, IF-IC	H, M, R, Mk
	5113	HDAC2 (3F3) Mouse mAb	W, IP, IF-IC	H, M, R, Mk
	2540	HDAC2 Antibody	W, IF-IC	H, M, R, Mk
	3314	JMJD1B (C69G2) Rabbit mAb	W, IP, IF-IC	H, Mk
	3100	JMJD1B (C6D12) Rabbit mAb	W, IP, IHC-P	H, Mk
	5377	JMJD1B (6A1-1F5) Mouse mAb	W, IP, IF-IC	H, M, R, Mk
	6891	Menin (D45B1) XP® Rabbit mAb	W, IF-IC	H, M, R, Mk, (B, Pg, Hr)
	3378	PCAF (C14G9) Rabbit mAb	W, IP, ChIP	H, M, R, Mk, (B, Hr)
	3379	PRMT4/CARM1 (C31G9) Rabbit mAb	W, IP, IF-IC	H, M, R, Mk
New	12495	PRMT4/CARM1 (3H2) Mouse mAb	W, IP, IF-IC, ChIP	H, M, R, Mk
	2820	Ring1A Antibody	W	H, M, R, Mk
	5694	RING1B (D22F2) XP® Rabbit mAb	W, IP, IF-IC, ChIP	H, M, R, Mk
New	9475	SirT1 (D1D7) Rabbit mAb	W, IF-IC	H, M, R, Mk, (C, B, Pg, Hr)
New	8469	SirT1 (1F3) Mouse mAb	W, IP, IF-IC	H, M, R, Mk
	8745	SNF5 (D9C2) Rabbit mAb	W	H, M, R, Mk, (Hm, C, X, B)
	3737	SUZ12 (D39F6) XP® Rabbit mAb	W, IP, IF-IC, ChIP	H, M, R, Mk, (Pg, Hr)
New	8729	SUV39H1 (D11B6) Rabbit mAb	W, IP	H, M, R, Mk, (B)
New	12387	UHRF1 (D6G8E) Rabbit mAb	W, IP	H, M, R

APPLICATIONS: **W** Western / **IP** Immunoprecipitation / **IHC** Immunohistochemistry / **IF** Immunofluorescence / **F** Flow Cytometry / **ChIP** Chromatin Immunoprecipitation / (**-IC** Immunocytochemistry, **-P** Paraffin, **-F** Frozen)

REACTIVITY: **H** human / **M** mouse / **R** rat / **Hm** hamster / **Mk** monkey / **C** chicken / **Mi** mink / **Dm** D. melanogaster / **X** Xenopus / **Z** zebra fish / **B** bovine / **Dg** dog / **Pg** pig / **Sc** S. cerevisiae / **Ce** C. elegans / **( )** 100% sequence homology