STEMCELL™ TECHNOLOGIES

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Small Molecules, Big Impact

In Pluripotent Stem Cell Research

Whether to affect self-renewal, survival, or differentiation of pluripotent stem cells (PSCs), or to aid reprogramming to an induced pluripotent stem cell state, the right small molecule can transform a research project. STEMCELL Technologies offers small molecules that are being widely used in high impact research to target the key pathways in stem cell biology. For more information and examples of how these molecules are being used in pluripotent stem cell research, visit **www.stemcell.com/smallmolecules**.

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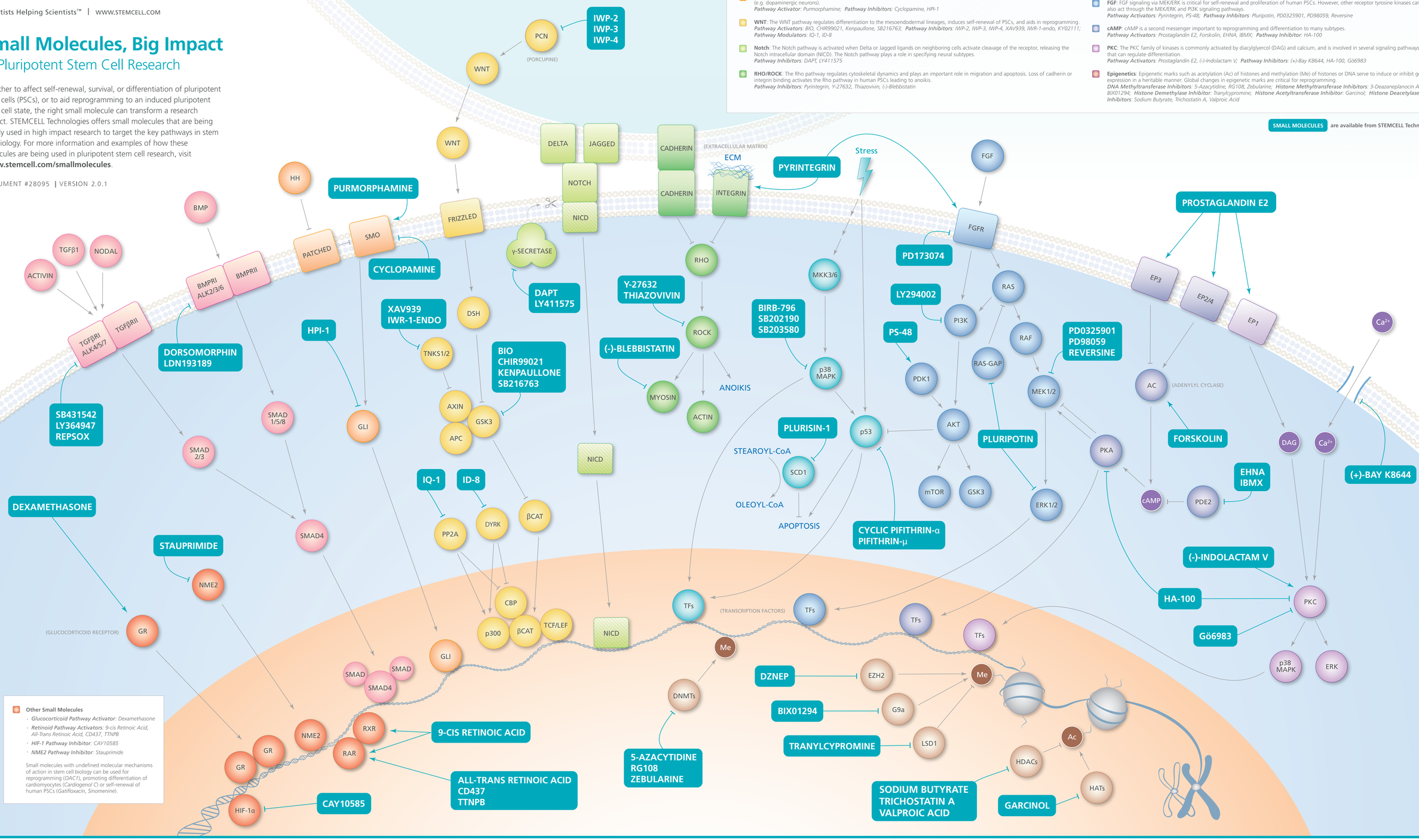
- **TGFβ**: The TGFβ superfamily members are major regulators of self-renewal and differentiation to mesendodermal lineages. *Pathway Activators: IDE1, IDE2;* *Pathway Inhibitors: SB431542, LY364947, RepSox, Dorsomorphin, LDN193189*
- **Hedgehog**: The Hedgehog pathway is important in the differentiation of mesenchymal subtypes (e.g. osteocytes) and in neural subtypes (e.g. dopaminergic neurons). *Pathway Activator: Purmorphamine;* *Pathway Inhibitors: Cyclopamine, HPI-1*
- **WNT**: The WNT pathway regulates differentiation to the mesoendodermal lineages, induces self-renewal of PSCs, and aids in reprogramming. *Pathway Activators: BIO, CHIR99021, Kenpaullone, SB216763;* *Pathway Inhibitors: IWP-2, IWP-3, IWP-4, XAV939, IWR-1-endo, KY02111;* *Pathway Modulators: IQ-1, ID-8*
- **Notch**: The Notch pathway is activated when Delta or Jagged ligands on neighboring cells activate cleavage of the receptor, releasing the Notch intracellular domain (NICD). The Notch pathway plays a role in specifying neural subtypes. *Pathway Inhibitors: DAPT, LY411575*
- **RHO/ROCK**: The Rho pathway regulates cytoskeletal dynamics and plays an important role in migration and apoptosis. Loss of cadherin or integrin binding activates the Rho pathway in human PSCs leading to anoikis. *Pathway Inhibitors: Pyrintegrin, Y-27632, Thiazovivin, (-)-Blebbistatin*
- **p38 / p53**: p38 MAPK is activated in response to cellular stresses, and influences apoptosis and cellular differentiation. p53 is activated in response to cellular stresses and regulates growth arrest, apoptosis and/or DNA repair. Inhibition of p53 is used to facilitate reprogramming. *Pathway Inhibitors: BIRB-796, SB202190, SB203580, Cyclic Pifithrin-α, Pifithrin-μ*
- **FGF**: FGF signaling via MEK/ERK is critical for self-renewal and proliferation of human PSCs. However, other receptor tyrosine kinases can also act through the MEK/ERK and PI3K signaling pathways. *Pathway Activators: Pyrintegrin, PS-48;* *Pathway Inhibitors: Pluripotin, PD0325901, PD98059, Reversine*
- **cAMP**: cAMP is a second messenger important to reprogramming and differentiation to many subtypes. *Pathway Activators: Prostaglandin E2, Forskolin, EHNA, IBMX;* *Pathway Inhibitor: HA-100*
- **PKC**: The PKC family of kinases is commonly activated by diacylglycerol (DAG) and calcium, and is involved in several signaling pathways that can regulate differentiation. *Pathway Activators: Prostaglandin E2, (-)-Indolactam V;* *Pathway Inhibitors: (+)-Bay K8644, HA-100, Gö6983*
- **Epigenetics**: Epigenetic marks such as acetylation (Ac) of histones and methylation (Me) of histones or DNA serve to induce or inhibit gene expression in a heritable manner. Global changes in epigenetic marks are critical for reprogramming. *DNA Methyltransferase Inhibitors: 5-Azacytidine, RG108, Zebularine;* *Histone Methyltransferase Inhibitors: 3-Deazaneplanocin A, BIX01294;* *Histone Demethylase Inhibitor: Tranylcypromine;* *Histone Acetyltransferase Inhibitor: Garcinol;* *Histone Deacetylase Inhibitors: Sodium Butyrate, Trichostatin A, Valproic Acid*

SMALL MOLECULES are available from STEMCELL Technologies.



- **Other Small Molecules**
  - *Glucocorticoid Pathway Activator: Dexamethasone*
  - *Retinoid Pathway Activators: 9-cis Retinoic Acid, All-Trans Retinoic Acid, CD437, TTNPB*
  - *HIF-1 Pathway Inhibitor: CAY10585*
  - *NME2 Pathway Inhibitor: Stauprimide*

  Small molecules with undefined molecular mechanisms of action in stem cell biology can be used for reprogramming (*OAC1*), promoting differentiation of cardiomyocytes (*Cardiogenol C*) or self-renewal of human PSCs (*Gatifloxacin, Sinomenine*).

STEMCELL Technologies is committed to making sure your research works. As Scientists Helping Scientists, we support our customers by creating novel products with consistent unfailing quality and by providing unparalleled technical support.

Generation of Human iPS Cells:

- TeSR™-E7™ (Cat #05910) for reprogramming fibroblasts
- ReproTeSR™ (Cat #05920) for reprogramming blood cells, use alone, or as part of an integrated workflow with the Erythroid Progenitor Reprogramming Kit (Cat #05924) or CD34+ Progenitor Reprogramming Kit (Cat #05925)

Maintenance of Human ES and iPS Cells:

- mTeSR™1 (Cat #05850), the most published feeder-free hPSCs maintenance medium
- TeSR™2 (Cat #05860), a more defined and xeno-free version of mTeSR™1
- TeSR™-E8™ (Cat #05940), a simplified, xeno-free maintenance medium for hPSCs

Differentiation of Human ES and iPS Cells:

- STEMdiff™ Neural System for generation, expansion, differentiation, characterization and cryopreservation of NPCs
- STEMdiff™ Definitive Endoderm Kit (Cat #05110/05115) for differentiation to multipotent definitive endoderm
- STEMdiff™ APEL™ and APEL™-LI (Cat #05210/05211) lineage-neutral media for customization of mesodermal differentiation protocols by adding cytokines or small molecules