

BI



BIOLOGICAL INDUSTRIES

SMALL MOLECULES FOR STEM CELL RESEARCH

Strategic portfolio of small molecules designed to streamline workflows for research in diabetes, neural disorders, and cardiovascular disease.



BI
Biological Industries
Culture of Excellence

SMALL MOLECULES

STRATEGIC PORTFOLIO OF SMALL MOLECULES FOR THE ENHANCED PERFORMANCE OF PLURIPOTENT STEM CELLS

Gain ultimate control over your cell cultures with Biological Industries' targeted portfolio of small molecules for stem cell research. While these small molecules are capable of modulating biological pathways across innumerable workflows, utilization with BI's family of NutriStem® hPSC Media creates a clean and streamlined culture environment, facilitating enhanced pluripotency and thus more efficient downstream processing when altering cellular circuitry.

Small Molecules are used as versatile tools that can manipulate and control cell fate across a wide span of research techniques, including cellular reprogramming, as well as self-renewal, survival, and differentiation. Constructed from renowned protocols, this specific selection of products will be of particular interest for applications focusing on diabetes, neurological, and cardiovascular research.

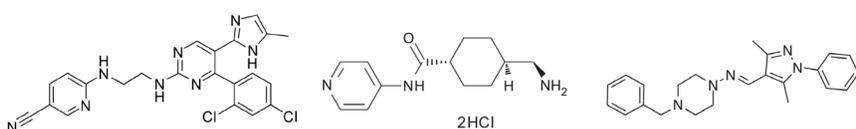


Figure 1: Structures of CHIR99021, Y27632, and SANT-1.

Diabetes Research

As the prevalence of diabetes continues to rise, sustainable treatment options are a critical necessity. The transplantation of stem cell-derived beta cells presents a novel and long-term solution for those suffering from type-1 diabetes. A method to derive functional insulin-producing beta cells from hPSCs designed by Pagliuca, et al. (2014) presents a six-stage protocol using a combination of multiple small molecules and growth factors (including [CHIR99021](#), [Retinoic Acid](#), [SANT-1](#), [LDN193189](#), [Compound E](#), and [RepSox](#)) and has shown promise in ameliorating hyperglycemia in mice.

Neural Research

Within the complex realm of neurological diseases, neural stem cells and precursor cells have incredible potential to not only replace injured or lost neurons, but also to act as delivery vehicles for compounds to the brain. Qi, et al. (2017) describes a protocol in which a cocktail of seven small molecules (including [LDN193189](#), [SB431542](#), [XAV939](#), and [CHIR99021](#)) allow for the creation of functional cortical neurons capable of producing long-range axonal projections. These cells begin to show mature neural characteristics in just 16 days, and later become fully functional with electrophysiological properties and full network integration in-vivo.

Cardiovascular Research

As the leading cause of death, globally, cardiovascular disease warrants an immense amount of research into potential treatment options. Stem cell-based therapies hold great promise in the possibility of regenerating functional cardiac tissue following myocardial infarction. Noor, et al. (2019) utilized cardiomyocyte differentiation protocols for hiPSCs created by Edri, et al. (2018) and Lian, et al. (2012) (incorporating small molecules such as [IWP-2](#), [IWP-4](#), and [CHIR99021](#)) for the creation of three-dimensional vascularized and perfusable heart patches to ultimately be applied to personalized cardiac models.

REPROGRAMMING

CHIR99021
RepSox
SB431542
Thiazovivin

MAINTENANCE

CHIR99021
Thiazovivin
Y27632

DIFFERENTIATION

CHIR99021
Compound E
IWP-2
IWP-4
LDN193189 (HCl)
RepSox
Retinoic Acid
SANT-1
SB431542
Triiodothyronine Salt
XAV939
Y27632



Small Molecule Selection Guide

ORDERING INFORMATION

PRODUCT NAME	PATHWAY / TARGET	APPLICATIONS	SIZE	CAT. NO.
CHIR99021	WNT pathway activator; Inhibits GSK3	Diabetes, Neural, Cardiovascular	10 mg	SM-0001-0010
Compound E	Gamma-secretase inhibitor	Neural Research	10 mg	SM-0002-0010
IWP-2	WNT inhibitor	Cardiovascular	10 mg	SM-0003-0010
IWP-4	WNT inhibitor	Cardiovascular	5 mg	SM-0004-0005
LDN193189 (HCl)	BMP inhibitor; Inhibits ALK2, ALK3, ALK6	Diabetes, Neural Research	10 mg	SM-0005-0010
RepSox	TGF β /activin/nodal inhibitor	Diabetes, Neural Research	10 mg	SM-0006-0010
Retinoic Acid	RA receptor agonist	Diabetes, Neural Research	500 mg	SM-0007-0500
SANT-1	Hedgehog inhibitor	Diabetes Research	10 mg	SM-0008-0010
SB431542	TGF β /activin/nodal inhibitor	Neural, Cardiovascular	10 mg	SM-0009-0010
Thiazovivin	RHO/ROCK pathway inhibitor	hPSC Self-Renewal	10 mg	SM-0010-0010
Triiodothyronine Salt	Activates β 1 thyroid hormone receptor	Diabetes, Cardiovascular	500 mg	SM-0011-0500
XAV939	TNKS/ β -catenin inhibitor	Neural, Cardiovascular	10 mg	SM-0012-0010
Y27632 (2HCl)	RHO/ROCK pathway inhibitor	hPSC Self-Renewal, Neural	10 mg	SM-0013-0010

To place an order in the US, contact Biological Industries USA at: tel: 860-316-2702; fax: 860-269-0596; email: orders@bioindusa.com.

Outside the US, contact your local distributor.





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