# Technical Data Sheet:    SB431542

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| Catalog Number | SML09B |
| Synonyms | Synonyms      SB-431542, SB 431542 |
| Size | 10 mg |
| Description | SB431542 is a highly-potent and -selective inhibitor of the TGF-β type I receptor, with specific inhibition of ALK5 ($IC_{50}$ of 94 nM) and its closest relatives ALK4 and ALK7 as part of the TGF-β/Activin/Nodal pathway. SB431542 has been shown to be a highly efficient additive for inducing neural differentiation of embryonic stem cells (ESCs) in a rapid manner when combined with Noggin (Chambers, et al.), or Noggin and LDN193189 (Cat. No. SML05B) (Edri, et al.), promoting the self-renewal of primitive neuroepithelia with hLIF and CHIR99021 (Cat. No. SML01B) (Li, et al. 2011), as well as the derivation of functional neurons from human pluripotent stem cells (PSCs) (Qi, et al.). Additionally, SB431542 allows for the enhanced differentiation of PSCs into cardiomyocytes (Kattman, et al.). |
| Molecular Weight | 384.39 |
| Molecular Formula | $C_{22}H_{16}N_4O_3$ |
| Chemical Name | Benzamide, 4-[4-(1,3-benzodioxol-5-yl)-5-(2-pyridinyl)-1H-imidazol-2-yl]- |
| CAS Number | 301836-41-9 |
| Target | TGF-β Receptor |
| Appearance | Yellow to pink (Solid) |
| Purity | ≥95% by LCMS |
| Solubility and Reconstitution | Soluble in DMSO up to 50 mM and in ethanol up to 10 mM, for example:<br>    10 mg/26.015 mL = 0.384 mg/mL = 1 mM<br>    10 mg/5.203 mL = 1.922 mg/mL = 5 mM<br>    10 mg/2.602 mL = 3.843 mg/mL = 10 mM<br>    10 mg/0.520 mL = 19.231 mg/mL = 50 mM |
| Storage Temperature and Stability | Powder:<br>    -20°C    3 years<br>     4°C    2 years<br>In solvent:<br>    -80°C    6 months<br>    -20°C    1 month |
| References | Chambers, et al. 2009. Highly efficient neural conversion of human ES and iPS cells by dual inhibition of SMAD signaling. Nature Biotechnology 27:275-280.<br><br>Edri, et al. 2015. Analysing human neural stem cell ontogeny by consecutive isolation of Notch active neural progenitors. Nature Communications 6(6500).<br><br>Kattman, et al. 2011. Stage-specific optimization of activin/nodal and BMP signaling promotes cardiac differentiation of mouse and human pluripotent stem cell lines. Cell Stem Cell. 8(2):228-240. |
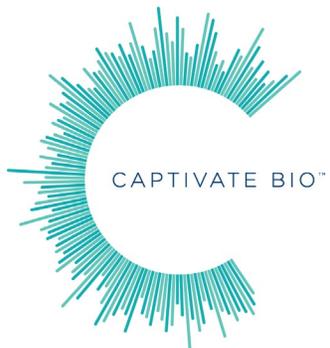
Li, et al. 2011. Rapid induction and long-term self-renewal of primitive neural precursors from human embryonic stem cells by small molecule inhibitors. PNAS. 108(20): 8299-304.

Qi, et al. 2017. Combined small-molecule inhibition accelerations the derivation of functional cortical neurons from human pluripotent stem cells. Nature Biotechnology 35(2): 154-163.