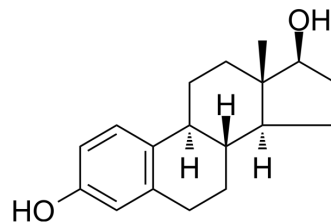


## Estradiol

|                           |   |       |          |
|---------------------------|---|-------|----------|
| <b>Cat. No.:</b>          | HY-B0141  |       |          |
| <b>CAS No.:</b>           | 50-28-2   |       |          |
| <b>Molecular Formula:</b> | C <sub>18</sub> H <sub>24</sub> O <sub>2</sub>                                |       |          |
| <b>Molecular Weight:</b>  | 272.38  |       |          |
| <b>Target:</b>            | Estrogen Receptor/ERR; Endogenous Metabolite; Bacterial                       |       |          |
| <b>Pathway:</b>           | Vitamin D Related/Nuclear Receptor; Metabolic Enzyme/Protease; Anti-infection |       |          |
| <b>Storage:</b>           | Powder  | -20°C | 3 years  |
|                           |   | 4°C   | 2 years  |
|                           | In solvent  | -80°C | 1 year   |
|                           |   | -20°C | 6 months |



### SOLVENT & SOLUBILITY

#### In Vitro

DMSO : 100 mg/mL (367.13 mM; Need ultrasonic)  
 Ethanol : 20 mg/mL (73.43 mM; Need ultrasonic)

| Preparing Stock Solutions | Solvent Concentration | Mass      |            |            |
|---------------------------|-----------------------|-----------|------------|------------|
|                           |                       | 1 mg      | 5 mg       | 10 mg      |
|                           | 1 mM                  | 3.6713 mL | 18.3567 mL | 36.7134 mL |
|                           | 5 mM                  | 0.7343 mL | 3.6713 mL  | 7.3427 mL  |
|                           | 10 mM                 | 0.3671 mL | 1.8357 mL  | 3.6713 mL  |

Please refer to the solubility information to select the appropriate solvent.

#### In Vivo

- Add each solvent one by one: corn oil  
Solubility: 12.5 mg/mL (45.89 mM); Suspended solution; Need ultrasonic
- Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline  
Solubility: ≥ 2.5 mg/mL (9.18 mM); Clear solution
- Add each solvent one by one: 5% DMSO >> 40% PEG300 >> 5% Tween-80 >> 50% saline  
Solubility: 2.5 mg/mL (9.18 mM); Suspended solution; Need ultrasonic
- Add each solvent one by one: 5% DMSO >> 95% (20% SBE-β-CD in saline)  
Solubility: ≥ 2.5 mg/mL (9.18 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)  
Solubility: ≥ 2.08 mg/mL (7.64 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% corn oil  
Solubility: ≥ 2.08 mg/mL (7.64 mM); Clear solution

### BIOLOGICAL ACTIVITY

|                                     |   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
|-------------------------------------|---|---------------|--|----------------|-------|------------------|------------------------------------|---------|---|---------------|--|----------------|-----------|------------------|---|---------|---|
| <b>Description</b>                  | Estradiol ( $\beta$ -Estradiol) is a steroid hormone and the major female sex hormone. Estradiol can up-regulate the expression of neural markers of human endometrial stem cells (hEnSCs) and promote their neural differentiation. Estradiol can be used for the research of cancers, neurodegenerative diseases and neural tissue engineering <sup>[1][2]</sup> .  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| <b>IC<sub>50</sub> &amp; Target</b> | Human Endogenous Metabolite   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| <b>In Vitro</b>                     | <p>Estradiol (10 nM, 7 days) induces neural differentiation and increased neurite branching of human endometrial stem cells (hEnSCs)<sup>[1]</sup>.</p> <p>Estradiol (17<math>\beta</math>-estradiol, 10 nM, 7 days) increases the expression of neuron-like cell markers (Tuj-1, nestin and NF-H) in neural-like cells differentiated from hEnSCs<sup>[1]</sup>.</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p> <p>Cell Differentiation Assay<sup>[1]</sup></p> <table border="1"> <tr> <td>Cell Line:</td> <td>Isolated human endometrial stem cells (hEnSCs) from human endometrial tissue</td> </tr> <tr> <td>Concentration:</td> <td>10 nM</td> </tr> <tr> <td>Incubation Time:</td> <td>7 days</td> </tr> <tr> <td>Result:</td> <td>Increased the number of neurite processes including neural differentiation and neurite branching.</td> </tr> </table> <p>Immunofluorescence<sup>[1]</sup></p> <table border="1"> <tr> <td>Cell Line:</td> <td>Isolated human endometrial stem cells (hEnSCs) from human endometrial tissue</td> </tr> <tr> <td>Concentration:</td> <td>10 nM</td> </tr> <tr> <td>Incubation Time:</td> <td>7 days</td> </tr> <tr> <td>Result:</td> <td>Increased the percentage of neural marker (Tuj-1, nestin and NF-H)-positive cells of 62.2<math>\pm</math>1.3%, 71.5<math>\pm</math>4% and 51.2<math>\pm</math>1.5% respectively.</td> </tr> </table> | Cell Line:    | Isolated human endometrial stem cells (hEnSCs) from human endometrial tissue | Concentration: | 10 nM | Incubation Time: | 7 days                             | Result: | Increased the number of neurite processes including neural differentiation and neurite branching. | Cell Line:    | Isolated human endometrial stem cells (hEnSCs) from human endometrial tissue | Concentration: | 10 nM     | Incubation Time: | 7 days  | Result: | Increased the percentage of neural marker (Tuj-1, nestin and NF-H)-positive cells of 62.2 $\pm$ 1.3%, 71.5 $\pm$ 4% and 51.2 $\pm$ 1.5% respectively.                 |
| Cell Line:                          | Isolated human endometrial stem cells (hEnSCs) from human endometrial tissue  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Concentration:                      | 10 nM   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Incubation Time:                    | 7 days  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Result:                             | Increased the number of neurite processes including neural differentiation and neurite branching.   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Cell Line:                          | Isolated human endometrial stem cells (hEnSCs) from human endometrial tissue  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Concentration:                      | 10 nM   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Incubation Time:                    | 7 days  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Result:                             | Increased the percentage of neural marker (Tuj-1, nestin and NF-H)-positive cells of 62.2 $\pm$ 1.3%, 71.5 $\pm$ 4% and 51.2 $\pm$ 1.5% respectively.   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| <b>In Vivo</b>                      | <p>Estradiol (1 nM, the hippocampal slices from FBN-ARO-KO mice) rescues long-term potentiation (LTP) amplitude<sup>[1]</sup>.</p> <p>Estradiol (0.0167 mg, implanted s.c., FBN-ARO-KO mice) rescues the molecular and functional deficits in FBN-ARO-KO mice<sup>[1]</sup>.</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p> <table border="1"> <tr> <td>Animal Model:</td> <td>FBN-ARO-KO Mice<sup>[2]</sup></td> </tr> <tr> <td>Dosage:</td> <td>1 nM</td> </tr> <tr> <td>Administration:</td> <td>Treated for the hippocampal slices</td> </tr> <tr> <td>Result:</td> <td>Rescued long-term potentiation (LTP) amplitude of both male and female mice.</td> </tr> </table> <table border="1"> <tr> <td>Animal Model:</td> <td>FBN-ARO-KO Mice<sup>[2]</sup></td> </tr> <tr> <td>Dosage:</td> <td>0.0167 mg</td> </tr> <tr> <td>Administration:</td> <td>Alzet minipumps with Estradiol (implanted s.c.), examined 7 days after minipump implantation.</td> </tr> <tr> <td>Result:</td> <td>Restored hippocampal and cortical E2 levels to 93%, phosphorylation of AKT, ERK and CREB in the hippocampus and cortex to 90-95%, BDNF level to 80-90%, restored both</td> </tr> </table>  | Animal Model: | FBN-ARO-KO Mice <sup>[2]</sup>   | Dosage:        | 1 nM  | Administration:  | Treated for the hippocampal slices | Result: | Rescued long-term potentiation (LTP) amplitude of both male and female mice.                      | Animal Model: | FBN-ARO-KO Mice <sup>[2]</sup>   | Dosage:        | 0.0167 mg | Administration:  | Alzet minipumps with Estradiol (implanted s.c.), examined 7 days after minipump implantation. | Result: | Restored hippocampal and cortical E2 levels to 93%, phosphorylation of AKT, ERK and CREB in the hippocampus and cortex to 90-95%, BDNF level to 80-90%, restored both |
| Animal Model:                       | FBN-ARO-KO Mice <sup>[2]</sup>  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Dosage:                             | 1 nM  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Administration:                     | Treated for the hippocampal slices  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Result:                             | Rescued long-term potentiation (LTP) amplitude of both male and female mice.  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Animal Model:                       | FBN-ARO-KO Mice <sup>[2]</sup>  |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Dosage:                             | 0.0167 mg   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Administration:                     | Alzet minipumps with Estradiol (implanted s.c.), examined 7 days after minipump implantation.   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |
| Result:                             | Restored hippocampal and cortical E2 levels to 93%, phosphorylation of AKT, ERK and CREB in the hippocampus and cortex to 90-95%, BDNF level to 80-90%, restored both   |               |  |                |       |                  |                                    |         |   |               |  |                |           |                  |   |         |   |

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synaptophysin and PSD95 in the forebrain.  
Rescued the spatial learning and memory defects.

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## CUSTOMER VALIDATION

- Neuro Oncol. 2024 Jan 5;26(1):137-152.
- Nat Chem Biol. 2022 Aug 18.
- Biosens Bioelectron. 12 July 2022, 114548.
- Theranostics. 2020 Aug 29;10(24):10874-10891.
- Pharmacol Res. 2021 Dec 29;106050.

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## REFERENCES

- [1]. Elham Hasanzadeh. Defining the role of 17 $\beta$ -estradiol in human endometrial stem cells differentiation into neuron-like cells. Cell Biol Int. 2021 Jan;45(1):140-153.
- [2]. Yujiao Lu, et al. Neuron-Derived Estrogen Regulates Synaptic Plasticity and Memory. J Neurosci. 2019 Apr 10;39(15):2792-2809.
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