

PowerStem EST

Special designed medium kit for the cultivation and proliferation of mouse embryonic stem cells and their differentiation into functional myocardial cells for a serum-free embryonic stem cell test (EST)

Product	Description	Catalogue-No.	Size
PowerStem EST	Serum-free medium for proliferation of mouse embryonic stem cells and differentiation into myocardial cells, Basal medium + 3 Supplements	ST04-77250K	500 ml

Product description

PowerStem EST is a chemically defined, serum-free system for the cultivation and proliferation of undifferentiated mouse embryonic stem cells (mES cells) and their subsequent differentiation into beating myocardial cells (e.g. for the embryonic stem cell test EST). The EST has been formally validated by the European Centre for Validation of Alternative Methods (ECVAM) as an acceptable *in vitro* embryotoxicity assay.

The *in vitro* embryonic stem cell test (EST) allows for categorisation of the embryotoxic potential of chemicals and drug candidates. For the screening process of newly developed chemicals and pharmaceuticals, a prediction model was developed based on the inhibition of differentiation of murine embryonic stem cells into cardiomyocytes. The application of the EST for chemical testing reduces time, testing costs and the amount of animal experimentation for embryotoxicity tests.

Content

PowerStem ESPro2 medium consists of:

- PowerStem EST basal medium (425 ml, Cat. No. ST04-77250B)
- PowerStem EST growth supplement (75 ml, Cat. No. ST04-7725S1), which is added at the time of use.
- PowerStem EST LIF supplement (1ml, Cat. No. ST04-7725S2), which is added at the time of use.
- PowerStem EST Differentiation supplement (1ml, Cat. No. ST04-7725S3), which is added at the time of use

Composition

PowerStem EST medium kit is composed of a complex basal medium containing salts, amino acids, vitamins, and micronutrients to which a serum-free supplement (PowerStem EST Growth Supplement) consisting of a mixture of proteins, growth factors and hormones is added immediately before to use.

For sustainment in undifferentiated condition and growth of ES cells, mouse leukemia inhibitory factor (mLIF, 1000 U/ml) is added to the supplemented basal medium (PowerStem EST LIF Supplement).

For differentiation into beating myocardial cells, a mix of differentiation factors (PowerStem EST Differentiation Supplement) is added to the supplemented basal medium (without mLIF).

Suitability

Testing of chemicals and pharmaceutical ingredients for mutagenicity, cytotoxicity and embryotoxicity (embryonic stem cell test, EST). In addition, cardiomyocytes differentiated from mES cells can be used for a multitude of purposes.

The basal medium is used for both, proliferation and differentiation; defined factors are added according to the objective – sustainment and growth or differentiation of ES cells.

Special Advantages

Traditionally, *in vitro* differentiation of mouse embryonic stem cells takes place using foetal bovine serum (FBS). It has been shown that the use of FBS is a limiting factor for successful differentiation of ES cells into cardiomyocytes. Some batches of FBS result in poor differentiation, while some batches may not allow differentiation at all. The search for suitable FBS batches and the dramatic variability makes the differentiation of ES cells with serum-containing media a time and money consuming exercise.

In contrast, it has been demonstrated that the number of differentiated ES cells is substantially increased under serum-free conditions and the rate of differentiation is quite stable. The PowerStem EST medium kit successfully stimulates the expansion of undifferentiated ES-cells and promotes their subsequent differentiation into beating myocardial cells under serum-free conditions, resulting in highly comparable findings from standardized experiments.

Instructions for Use

Store supplemented PowerStem EST in a refrigerator at 2-8° C (protected from light). LIF Supplement or Differentiation Supplement is added to the basal medium (with growth supplement) immediately before use. Supplemented complete medium is stable for one month, but is best used fresh. Warm up only the amount of medium needed. Please avoid repeated freeze-thaw cycles of supplements! Do not freeze complete media!

Adaption, cultivation and proliferation of undifferentiated ES cells:

When initial culture was performed in serum containing medium, the embryonic stem cells are gradually adapted to the serum-free medium, which has been supplemented with Growth Supplement and LIF Supplement. In the process, the FBS concentration is slowly reduced (from passage to passage) and the concentration of PowerStem EST is gradually increased. By adding mLIF (1000U/ml), the cells are maintained in an undifferentiated state. Cell cultivation is performed in gelatine-coated (0.1%) culture dishes.

Initial culture of ES cells

P1: 100% serum containing medium - 0% PowerStem EST

P2: 75% serum containing medium - 25% PowerStem EST

P3: 50% serum containing medium - 50% PowerStem EST

P4: 25% serum containing medium - 75% PowerStem EST

P5: 0% serum containing medium - 100% PowerStem EST

Differentiation assay procedure:

For differentiation, a mix of various factors (PowerStem EST Differentiation Supplement) is added to the supplemented basal medium.

Technical support

For technical support, questions or remarks please contact your local PAN-Seratech partner or the technical department of PAN-Seratech via email (info@pan-seratech.com) or phone +49-8543-601630.

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