[0007] In order to obtain hESCs which more closely resemble the native pluripotent epiblast, a transgene free method would be advantageous.

[0008] Accordingly, it is an aim of the present invention to provide and maintain a pluripotent stem cell state that ameliorates the disadvantages of the prior art and differentiates more efficiently.

SUMMARY OF THE INVENTION

[0009] In a first aspect there is provided a method for culturing and maintaining a pluripotent stem cell in an undifferentiated state comprising culturing the pluripotent stem cell in a medium comprising an MEK inhibitor, a GSK3 inhibitor, a dual inhibitor of AMPK and/or BMP signaling and LIF.

[0010] In a second aspect there is provided a pluripotent stem cell produced by the method as described herein.

[0011] In a third aspect there is provided a method for generating lineage specific cells from a pluripotent stem cell, comprising: a) culturing a pluripotent stem cell in an undifferentiated state according to the method described herein; b) isolating the undifferentiated pluripotent stem cell; and c) culturing the isolated undifferentiated pluripotent stem cell in a culture medium suitable to differentiate the isolated pluripotent stem cell into a lineage specific cell.

[0012] In a fourth aspect there is provided a kit when used in the method as described herein for culturing and maintaining a pluripotent stem cell in an undifferentiated state comprising a culture medium as described and instructions for use.

[0012a] In a fifth aspect there is provided a culture medium for culturing and maintaining a pluripotent stem cell in an undifferentiated state, wherein said culture medium comprises an MEK inhibitor, GSK3 inhibitor, a dual inhibitor of AMPK and/or BMP signaling and LIF.