Claims

1. A method for producing a human cell aggregate comprising a cerebellar progenitor tissue, comprising subjecting an aggregate of human pluripotent stem cells to suspension culturing in a serum-free medium containing insulin, and treating, in the suspension culturing, the aggregate of human pluripotent stem cells or a human cell aggregate derived therefrom with a ROCK inhibitor, a TGFβ signal inhibitor, and a first fibroblast growth factor;
wherein the ROCK inhibitor is selected from the group consisting of Y-27632 ((+)-(R)-trans-4-(1-aminoethyl)-N-(4-pyridyl)cyclohexanecarboxamide), Fasudil (5-(1-Homopiperazinyl)sulfonylisoquinoline),and H-1152((S)-(+)-2-Methyl-1-[(4-methyl-5-isoquinolinyl)sulfonyl]-hexahydro-1H-1,4-diazepine);
and wherein the TGFβ signal inhibitor is selected from the group consisting of SB431542 (4-(5-benzol[1,3]dioxol-5-yl-4-pyridin-2-yl-1H-imidazol-2-yl)-benzamide), LY-364947, SB-505 and A-83-01;
and wherein the first fibroblast growth factor is FGF2 or FGF8.

2. The production method according to claim 1, wherein the cerebellar progenitor tissue is a midbrain-hindbrain boundary neural progenitor tissue.

3. The production method according to claim 1 or 2, wherein the aggregate of human pluripotent stem cells or a human cell aggregate derived therefrom is not treated with BMP4 in the suspension culturing.

4. The production method according to any one of claims 1 to 3, wherein the aggregate of human pluripotent stem cells or a human cell aggregate derived therefrom is not treated with a sonic hedgehog inhibitor in the suspension culturing;

wherein the sonic hedgehog inhibitor is selected from the group consisting of cyclopamine, jervine, GANT61, SANT-2, tomatidine, zerumbone, GDC-0449, XL139, IPI926, IPI609, LDE225, triparanol and AY9944.

5. The production method according to claim 1, comprising
(I) subjecting an aggregate of human pluripotent stem cells to suspension culturing in a serum-free medium containing insulin, and treating, in the suspension culturing, the aggregate of human pluripotent stem cells or a human cell aggregate derived therefrom with a ROCK inhibitor, a TGFβ signal inhibitor, and a first fibroblast growth factor, to obtain a human cell aggregate containing a midbrain-hindbrain boundary neural progenitor tissue, and
(II) subjecting the obtained human cell aggregate containing the midbrain-hindbrain boundary neural progenitor tissue to further suspension culturing in a serum-free medium to induce formation of a neuroepithelial structure by neural progenitors in the neural progenitor tissue, thereby obtaining the human cell aggregate containing the cerebellar plate tissue;
wherein the ROCK inhibitor is selected from the group consisting of Y-27632 ((+)-(R)-trans-4-(1-aminoethyl)-N-(4-pyridyl)cyclohexanecarboxamide), Fasudil (5-(1-Homopiperazinyl)sulfonylisoquinoline),and H-1152((S)-(+)-2-Methyl-1-[(4-methyl-5-isoquinolinyl)sulfonyl]-hexahydro-1H-1,4-diazepine);
and wherein the TGFβ signal inhibitor is selected from the group consisting of SB431542 (4-(5-benzol[1,3]dioxol-5-yl-4-pyridin-2-yl-1H-imidazol-2-yl)-benzamide), LY-364947, SB-505 and A-83-01;
and wherein the first fibroblast growth factor is FGF2 or FGF8.

6. The production method according to claim 6, which comprises further treating, in the suspension culturing in

step (I), the aggregate of human pluripotent stem cells or the human cell aggregate derived therefrom with a second fibroblast growth factor;
wherein the second fibroblast growth factor is FGF19, FGF17 or FGF8.

7. The production method according to any one of claims 5 to 6, which comprises treating, in the suspension culturing in step (II), the human cell aggregate containing the midbrain-hindbrain boundary neural progenitors or a human cell aggregate derived therefrom with SDF1.

8. The production method according to claim 5, which comprises treating, in the suspension culturing in step (II), the human cell aggregate containing the midbrain-hindbrain boundary neural progenitors or a human cell aggregate derived therefrom with GDF7.

9. A method for producing human Purkinje cells, human Golgi cells or human interneurons, comprising
(I) obtaining a human cell aggregate containing cerebellar plate tissue from human pluripotent stem cells by the production method according to any one of claims 5 to 8,
(II) obtaining a GABAergic neural progenitors from the obtained human cell aggregate, and
(III) coculturing the GABAergic neural progenitors with mammalian cerebellar granule cell progenitors to induce differentiation of the GABAergic neural progenitors into Purkinje cells, Golgi cells or interneurons.

10. A method for producing human cerebellar granule cells, comprising
(I) obtaining a human cell aggregate containing cerebellar plate tissue from human pluripotent stem cells by the production method according to any one of claims 5 to 8,
(II) obtaining cerebellar granule cell progenitors from the

obtained human cell aggregate, and
(III) coculturing the cerebellar granule cell progenitors with mammalian cerebellar cell to induce differentiation into cerebellar granule cells.