What is claimed is:

1. A highly functional platelet production promoting agent which comprises one or a plurality of aryl hydrocarbon receptor (AhR) antagonists and one or a plurality of Rho-associated coiled-coil forming kinase (ROCK) inhibitors.

2. The platelet production promoting agent according to claim 1, wherein the AhR antagonist is selected from the group consisting of 4-(2-(2-(benzo[b]thiophen-3-yl)-9-isopropyl-9H-purin-6-ylamino)ethyl)phenol (SR-1), 2-methyl-2H-pyrazole-3-carboxylic acid (2-methyl-4-o-tolylazo-phenyl)-amide (CH-223191), N-[2-(3H-indol-3-yl)ethyl]-9-isopropyl-2-(5-methyl-3-pyridyl)purin-6-amine (GNF-351), 6,2',4'-trimethoxyflavone (TMF) and 3',4'-dimethoxyflavone (DMF).

3. The platelet production promoting agent according to claim 1 or 2, wherein the ROCK inhibitor is selected from the group consisting of Y27632, Y39983, fasudil hydrochloride, ripasudil, SLX-2119, RKI-1447, azaindole1, SR-3677, Staurosporine and H1152 dihydrochloride.

4. The platelet production promoting agent according to any of claims 1 to 3, wherein the AhR antagonist is SR-1, GNF-351 and/or CH-223191, and the ROCK

inhibitor is Y27632, Y39983, fasudil hydrochloride and/or ripasudil.

5. A method for producing platelets *in vitro*, which comprises a step for bringing the platelet production promoting agent according to any of claims 1 to 4 into contact with megakaryocytes or progenitor cells thereof.

6. The method according to claim 5, wherein the contact step is carried out under conditions of not using feeder cells.

7. The method according to claim 6, which is carried out under shake culturing conditions.

8. The method according to any of claims 5 to 7, further comprising a step for suppressing the expression or function of high mobility group At-hook (HMGA) proteins in the megakaryocytes or progenitor cells thereof.

9. The method according to claim 8, wherein suppression of the expression or function of the HMGA proteins is carried out by siRNA or miRNA that directly or indirectly suppresses expression of HMGA gene.

10. The method according to any of claims 5 to 9, wherein the megakaryocytes are cells obtained by overexpressing at least one gene selected from the group consisting of a cancer gene, polycomb gene and apoptosis suppressor gene in cells less differentiated than the megakaryocytes, followed by terminating the overexpression.

11. The method according to claim 10, wherein the cells less differentiated than the megakaryocytes are hematopoietic progenitor cells produced from pluripotent stem cells.

12. The method according to any one of claims 5 to 11, further comprising a step for recovering platelets from the megakaryocytes.