CLAIMS:

1. A cell culture apparatus, comprising: (a) a central medium container, said central medium container comprising a cell culture medium, wherein said central medium container does not contain cells; and (b) a plurality of 3-D culture vessels, wherein each of said 3-D culture vessels comprises cell carriers, comprising a 3-D matrix; wherein said central medium container is operably connected to said culture vessels via medium conduits that direct said medium from said central medium container through said 3-D matrix of said culture vessels in a parallel configuration, wherein each 3-D culture vessel is connected to a circulation pump to thereby allow controlling the flow rate in each of said 3-D culture vessels, and wherein said culture medium can flow through said 3-D culture vessels downward with the gravitation force and upward against the gravitation force.

2. The cell culture apparatus of claim 1, further comprising heating blankets for each 3-D culture vessel so as to allow temperature control and insulation of each one of said 3D culture vessel.

3. The cell culture apparatus of claim 1, further comprising flow diffuser configured to spread the entering medium from said central medium container homogeneously within said 3-D culture vessels.

4. The cell culture apparatus of claim 1, wherein said 3-D matrix is a fibrous matrix.

5. The cell culture apparatus of claim 1, wherein said culture vessels comprise living cells.

6. The cell culture apparatus of claim 5, wherein said culture vessels are further operably connected to a means of measuring viability of said living cells.

7. The cell culture apparatus of claim 1, wherein said central medium container comprises means of monitoring and controlling the pH of said medium and/or dissolved oxygen concentration in said medium.

8. The cell culture apparatus of claim 1, wherein said central medium container comprises means of collecting data on conditions within said central medium container

and/or means of collecting data on transfer of fluid into and/or out of each of said culture vessels.

9. The cell culture apparatus of claim 1, wherein said cell culture apparatus comprises means of controlling a flow rate of fluid material transferred into each of said culture vessels.

10. The cell culture apparatus of claim 5, wherein said cells are adherent stromal cells that are derived from either one of: placenta, adipose tissue, bone marrow, and mixture thereof.

11. The cell culture apparatus according to claims 5-6 or 10, further comprising cells harvest system to allow harvesting the cells grown in said culture vessels.

12. The cell culture apparatus of claim 11, wherein the harvesting of the cells is made by oscillating the 3-D matrix within the culture vessels without the need to move the cells culture vessels to a different housing.

13. The cell culture apparatus of claim 11, wherein said harvesting system comprises at least a tower, a harvest module, harvest bag module, an electrical cabinet and said central medium container.

14. The cell culture apparatus of any one of the preceding claims, further comprising flow disruptor configured to spread the entering medium from said central medium container homogeneously within said 3-D culture vessels.

15. The cell culture apparatus of any one of the preceding claims, wherein said plurality of 3-D culture vessels allows growing cells in large scale.