What is claimed is:

1. An infusion system which comprises:

an elongated catheter formed with a central lumen extending between a proximal end and a distal end;

a source of a fluid medium having particles suspended therein, wherein the source is connected in fluid communication with the proximal end of the catheter;

a tip formed with a plurality of parallel lumens, wherein the tip is affixed to the distal end of the catheter to individually place each lumen of the tip in fluid communication with the central lumen, and wherein each individual lumen is dimensioned to sequentially receive particles therethrough; and

a means for moving the fluid medium with suspended particles through the lumen of the catheter, for further movement of the particles in alignment through individual lumens of the tip.

2. A system as recited in claim 1 wherein the catheter has an outer surface and is tubular shaped to define an axis, and wherein the system further comprises:

a configurable valve positioned on the outer surface of the catheter to surround the catheter at a location proximal to the tip, wherein the valve is formed with a plurality of apertures arranged around the axis of the catheter to allow for axial movement of a fluid through the apertures and on past the catheter in a distal direction substantially parallel to the axis of the catheter; and

a means for selectively configuring the valve to control the flow rate of fluid through the apertures.

3. A system as recited in claim 2 wherein the valve is formed as an annulus centered on the axis with an inner diameter conformed to the outer surface of the catheter, and wherein the valve is inflatable into a base configuration wherein an outer diameter is established at a predetermined radial distance beyond the outer surface of the catheter, and further wherein an additional inflation of the valve substantially maintains the outer diameter while incrementally constricting the apertures.

4. A system as recited in claim 3 wherein the annulus comprises:

a compliant material responsive to the configuring means to selectively constrict the apertures; and

a substantially non-compliant material positioned on a periphery of the annulus to maintain the outer diameter at the predetermined radial distance from the outer surface of the catheter during a constriction of the apertures.

5. A system as recited in claim 3 further comprising a guide wire selectively engaged with the tip to position the tip in a vasculature vessel of a patient.

6. A system as recited in claim 5 wherein the configuring means is operated to maintain valve contact with the vessel when the valve is in its base configuration.

7. A system as recited in claim 1 wherein the fluid medium is selected from a group consisting of agents useful for gene therapy, drug therapy and protein therapy.

8. A system as recited in claim 1 wherein the particles are stem cells.

9. A system as recited in claim 1 further comprising a fluid flow controller positioned to meter fluid flow from the source into the central lumen of the catheter.

10. A system for introducing particles into a first fluid flowing through a substantially tubular shaped vessel, the system comprising:

a source of the particles suspended in a second fluid;

a substantially cylindrical shaped filter in fluid communication with the particle source, wherein the filter defines an axis and is formed with a plurality of longitudinally aligned, parallel lumens, with each lumen dimensioned to receive particles therethrough, and wherein the filter is positioned in the vessel;

a configurable valve positioned around the filter and affixed thereto, with the valve extending radially outward from the filter and into contact with the vessel, wherein the valve is formed with a plurality of apertures arranged around the axis of the filter to allow for axial movement of the first fluid through the apertures in a direction substantially parallel to the axis of the filter;

a means for moving particles from the source, through the filter, and into the vessel; and

a means for selectively configuring the valve to control the flow rate of the first fluid through the apertures as particles emerge from the filter for introduction into the first fluid.

11. A system as recited in claim 10 further comprising a catheter for interconnecting the particle source with the filter.

12. A system as recited in claim 10 wherein the valve is formed as an annulus centered on the filter axis with an inner diameter conformed to the outer surface of the filter, and wherein the valve is inflatable into a base configuration wherein an outer diameter is established at a predetermined radial distance from the filter, and further wherein an additional inflation of the valve substantially maintains the outer diameter while incrementally constricting the apertures.

13. A system as recited in claim 12 wherein the annulus comprises:

a compliant material responsive to the configuring means to selectively constrict the apertures; and

a substantially non-compliant material positioned on a periphery of the annulus to maintain the outer diameter at the predetermined radial distance from the outer surface of the catheter during a constriction of the apertures.

14. A system as recited in claim 12 wherein the configuring means is operated to maintain valve contact with the vessel when the valve is in its base configuration.

15. A system as recited in claim 10 wherein the particles are selected from a group consisting of agents useful for gene therapy, drug therapy and protein therapy.

16. A system as recited in claim 10 wherein the particles are stem cells.

17. A system as recited in claim 10 further comprising a fluid flow controller positioned to meter fluid flow from the source into the central lumen of the catheter.

18. A method for introducing particles into a first fluid flowing through a substantially tubular shaped vessel, the method comprising the steps of:

providing a source of the particles suspended in a second fluid;

connecting a substantially cylindrical shaped filter in fluid communication with the particle source, wherein the filter defines an axis and is formed with a plurality of longitudinally aligned, parallel lumens, with each lumen dimensioned to receive particles therethrough, and wherein the filter is positioned in the vessel, and further wherein a configurable valve is positioned around the filter and affixed thereto, with the valve extending radially outward from the filter and into contact with the vessel, wherein the valve is formed with a plurality of apertures arranged around the axis of the filter to allow for axial movement of the first fluid through the apertures in a direction substantially parallel to the axis of the filter;

positioning the filter in the vessel; and

selectively configuring the valve to control the flow rate of the first fluid through the apertures as particles emerge from the filter for introduction into the first fluid.

19. A method as recited in claim 18 wherein the valve is formed as an annulus centered on the filter axis with an inner diameter conformed to the outer surface of the filter, and the method further comprises the steps of:

inflating the valve into a base configuration wherein an outer diameter is established at a predetermined radial distance from the filter; and

performing an additional inflation of the valve to substantially maintain the outer diameter while incrementally constricting the apertures.

20. A method as recited in claim 18 wherein the particles are stem cells.

What is claimed is:

1. An infusion system which comprises:

an elongated catheter formed with a central lumen extending between a proximal end and a distal end;

a source of a fluid medium having particles suspended therein, wherein the source is connected in fluid communication with the proximal end of the catheter;

a tip defining an axis and formed with a plurality of parallel lumens extending through the tip in an axial direction, wherein the tip is affixed to the distal end of the catheter to individually place each lumen of the tip in fluid communication between the central lumen and a vessel of a patient, and wherein each individual lumen is dimensioned to sequentially receive a portion of the fluid medium containing suspended particles therethrough, and wherein each lumen is sufficiently small to effectively separate the particles from clinging to each other as the particles are received into the lumen; and

a device for moving the fluid medium with suspended particles through the lumen of the catheter, for further movement of the particles in alignment through individual lumens of the tip.

2. A system as recited in claim 1 wherein the catheter has an outer surface and is tubular shaped to define an axis, and wherein the system further comprises:

a configurable valve positioned on the outer surface of the catheter to surround the catheter at a location proximal to the tip, wherein the valve is formed with a plurality of apertures arranged around the axis of the catheter to allow for axial movement of a fluid through the apertures and on past the catheter in a distal direction substantially parallel to the axis of the catheter; and

an inflator for selectively configuring the valve to control the flow rate of fluid through the apertures.

3. A system as recited in claim 2 wherein the valve is formed as an annulus centered on the axis with an inner diameter conformed to the outer surface of the catheter, and wherein the valve is inflatable into a base configuration wherein an outer diameter is established at a predetermined radial distance beyond the outer surface of the catheter, and further wherein an additional inflation of the valve substantially maintains the outer diameter while incrementally constricting the apertures.

4. A system as recited in claim 3 wherein the annulus comprises:

a compliant material responsive to the inflator to selectively constrict the apertures; and

a substantially non-compliant material positioned on a periphery of the annulus to maintain the outer diameter at the predetermined radial distance from the outer surface of the catheter during a constriction of the apertures.

5. A system as recited in claim 3 further comprising a guide wire selectively engaged with the tip to position the tip in a vasculature vessel of a patient.

6. A system as recited in claim 5 wherein the inflator is operated to maintain valve contact with the vessel when the valve is in its base configuration.

7. A system as recited in claim 1 wherein the particles are selected from a group consisting of agents useful for gene therapy, drug therapy and protein therapy.

8. A system as recited in claim 1 wherein the particles are stem cells.

9. A system as recited in claim 1 wherein the device is a fluid flow controller positioned to meter fluid flow from the source into the central lumen of the catheter.

10. A system for introducing particles suspended in a first fluid into a second fluid flowing through a substantially tubular shaped vessel, the system comprising:

a source of the particles suspended in the first fluid;

a substantially cylindrical shaped separator in fluid communication with the particle source, wherein the separator defines an axis and is formed with a plurality of longitudinally aligned, parallel lumens, with each lumen dimensioned to receive a portion of the first fluid containing suspended particles therethrough, and wherein the separator is positionable in the vessel;

a configurable valve positioned around the separator and affixed thereto, with the valve extending radially outward from the separator so as to come into contact with the vessel, wherein the valve is formed with a plurality of apertures arranged around the axis of the separator to allow for axial movement of the second fluid through the apertures in a direction substantially parallel to the axis of the separator;

a device for moving particles from the source, through the separator, and into the vessel; and

an inflator for selectively configuring the valve, wherein the inflator incrementally constricts the apertures to control the flow rate of the second fluid through the apertures as particles emerge from the separator for introduction into the second fluid.

11. A system as recited in claim 10 further comprising a catheter with a central lumen for interconnecting the particle source with the separator, wherein the catheter has an inner surface and an outer surface.

12. A system as recited in claim 11 wherein the valve is formed as an annulus centered on the separator axis with an inner diameter conformed to the outer surface of the catheter, and wherein the valve is inflatable into a base configuration wherein an outer diameter is established at a predetermined radial distance from the catheter, and further wherein an additional inflation of the valve substantially maintains the outer diameter while incrementally constricting the apertures.

13. A system as recited in claim 12 wherein the annulus comprises:

a compliant material responsive to the inflator to selectively constrict the apertures; and

a substantially non-compliant material positioned on a periphery of the annulus to maintain the outer diameter at the predetermined radial distance from the outer surface of the catheter during a constriction of the apertures.

14. A system as recited in claim 12 wherein the inflator is operated to maintain valve contact with the vessel when the valve is in its base configuration.

15. A system as recited in claim 11 wherein the device is a fluid flow controller positioned to meter fluid flow from the source into the central lumen of the catheter.

16. A system as recited in claim 10 wherein the particles are selected from a group consisting of agents useful for gene therapy, drug therapy and protein therapy.

17. A system as recited in claim 10 wherein the particles are stem cells.

18. A method for introducing particles suspended in a first fluid into a second fluid flowing through a substantially tubular shaped vessel, the method comprising the steps of:

providing a source of the particles suspended in the first fluid;

connecting a substantially cylindrical shaped separator in fluid communication with the particle source through a catheter having an outer surface and formed with a central lumen, wherein the separator defines an axis and is formed with a plurality of longitudinally aligned, parallel lumens extending through the separator in an axial direction between the central lumen and the vessel, with each lumen dimensioned to receive a portion of the first fluid containing suspended particles therethrough, and wherein the separator is positioned in the vessel, and further wherein a configurable valve is positioned around the separator and affixed thereto, with the valve extending radially outward from the separator and into contact with the vessel, wherein the valve is formed with a plurality of apertures arranged around the axis of the separator to allow for axial movement of the second fluid through the apertures in a direction substantially parallel to the axis of the separator;

positioning the separator in the vessel; and

inflating the valve, wherein inflation of the valve incrementally constricts the apertures to control the flow rate of the second fluid through the apertures as particles emerge from the separator for introduction into the second fluid.

19. A method as recited in claim 18 wherein the valve is formed as an annulus centered on the separator axis with an inner diameter conformed to the outer surface of the catheter, and the method further comprises the steps of:

inflating the valve into a base configuration wherein an outer diameter is established at a predetermined radial distance from the catheter; and

performing an additional inflation of the valve to substantially maintain the outer diameter while incrementally constricting the apertures.

20. A method as recited in claim 18 wherein the particles are stem cells.