CLAIM(S):

1. A diafiltration system comprising

(a) a fluid treatment assembly comprising two or more fluid treatment modules, the fluid treatment assembly comprising a feed inlet, a permeate outlet, and a retentate outlet;

(i) each fluid treatment module comprising a cross flow treatment assembly including at least one ultrafiltration membrane, the cross flow treatment assembly having at least one feed side and at least one opposite permeate side, and a diafiltration fluid distribution plate comprising a diafiltration fluid feed inlet and a common feed permeate/diafiltration fluid permeate outlet port;

(b) two or more separate diafiltration fluid conduits, each separate diafiltration fluid conduit in fluid communication with a respective single diafiltration fluid feed inlet;

(c) a diafiltration fluid pump, the diafiltration fluid pump comprising at least a first multiple channel pump head having at least two channels including separate channels for separate diafiltration fluid conduits in fluid communication with respective single diafiltration fluid feed inlets, wherein the diafiltration pump provides simultaneously controlled diafiltration fluid flow rates through each of the separate diafiltration fluid conduits to the respective single diafiltration fluid feed inlets; and,

the system further comprises a feed fluid pump and a feed fluid conduit, wherein the feed fluid conduit is in fluid communication with the fluid treatment assembly feed inlet, wherein the feed fluid pump provides a controlled feed fluid flow rate through the feed fluid conduit to the fluid treatment assembly feed inlet.

2. The diafiltration system of claim 1, including at least one additional channel pump head including a separate channel for a separate diafiltration fluid conduit in fluid communication with a single diafiltration fluid feed inlet, wherein the pump, via the first multiple channel pump head and the additional channel pump head, provides simultaneously

controlled diafiltration fluid flow rates through each of the separate diafiltration fluid conduits to the respective single diafiltration fluid feed inlets.

3. The diafiltration system of claim 1 or 2, including at least one additional multiple channel pump head having at least two channels including a separate channel for a separate diafiltration fluid conduit in fluid communication with a single diafiltration fluid feed inlet, wherein the pump, via the first multiple channel pump head and the additional multiple channel pump head, provides simultaneously controlled diafiltration fluid flow rates through each of the separate diafiltration fluid conduits to the respective single diafiltration fluid feed inlets.

4. The diafiltration system of any one of claims 1-3, further comprising a retentate throttling valve, arranged to allow the system to maintain a desired ratio of feed flow rate to retentate flow rate.

5. A diafiltration method, the method comprising passing a feed fluid containing undesirable material and desirable biomolecules, and a diafiltration fluid suitable for washing out undesirable material from the feed fluid, through the fluid treatment assembly in the diafiltration system of any one of claims 1-4, wherein the method includes

(a) passing the feed fluid at a controlled feed fluid flow rate through the feed inlet of the fluid treatment assembly;

(b) passing the diafiltration fluid at a controlled diafiltration fluid flow rate through each of the separate diafiltration fluid conduits in fluid communication with respective single diafiltration fluid feed inlets, such that the diafiltration fluid washes undesirable material from the feed fluid, wherein the controlled diafiltration fluid flow rate is simultaneously controlled through each of the separate diafiltration fluid conduits;

(c) passing a feed permeate/diafiltration fluid permeate fluid through each of the common feed permeate/diafiltration fluid permeate outlet ports;

(d) passing a retentate fluid from the retentate outlet of fluid treatment assembly, the retentate fluid comprising desirable biomolecules and a lower concentration of undesirable material than the concentration of undesirable material in the feed fluid; and,

(e) passing the feed permeate/diafiltration fluid permeate fluid from the permeate outlet of the fluid treatment assembly, the method including

passing the feed fluid through the feed inlet at a controlled flow rate that is at least about 10% less than the simultaneously controlled diafiltration fluid flow rates through each of the separate diafiltration fluid conduits.