CLAIMS

1. A chromatography system comprising

a first valve in fluid connection to a first chromatography column and~~/or~~ a second valve;

the second valve in fluid connection to a second chromatography column and the first valve;

wherein the first valve and the second valve are operable to provide:

i. a mode A that selectively allows a fluid to flow from the first chromatography column to the second chromatography column;

ii. a mode B that selectively allows the fluid to bypass the first chromatography column; and~~/or~~

iii. a mode C that selectively allows the fluid to bypass the second chromatography column.

wherein the first valve is an injection valve, optionally the second valve is a column valve;

wherein the first valve is positioned parallel to the first chromatography column.

2. The system of claim 1, wherein the first valve in fluid connection to the first chromatography column and the second valve in fluid connection to the second chromatography column are in tandem arrangement.

3. The system of claim 1 or 2, wherein the first valve is operable to selectively allow fluid flow

to flow through the first chromatography column; or

to bypass the first chromatography column.

4. The system of claim 3, wherein an outlet of the first valve is linked to an inlet of the second valve.

5. The system of claim 4, wherein the second valve is operable to selectively allow fluid flow

to flow through the second chromatography column or

to bypass the second chromatography.

6. The system of any one of the claims 3 to 5, wherein

i. in the mode A, the first valve directs the fluid to flow from the first chromatography column ~~connected to the first valve~~ to the second chromatography column ~~connected to the second valve~~;

ii. in the mode B, wherein the first valve directs the fluid to bypass the first chromatography column, thereby directing the fluid to flow from the first valve to the second chromatography column ~~connected to the second valve~~; and

iii. in the mode C, wherein the first valve directs the fluid to flow through the first chromatography column ~~connected to the first valve~~ to the second valve that directs the solution to bypass the second chromatography column.

~~7. The system of any one of the preceding claims, wherein the first valve is an injection valve, optionally the second valve is a column valve.~~

7~~8~~. The system of any one of the preceding claims, wherein the first chromatography column is a flow-through chromatography column or a bind & elute chromatography column and the second chromatography column is a flow-through chromatography column or a bind & elute chromatography column.

8~~9~~. The system of any one of the preceding claims, wherein the first chromatography column is a flow-through chromatography column and the second chromatography column is a bind & elute chromatography column, optionally

wherein the system directs fluid to flow in mode A and in mode B, sequentially.

9~~10~~. The system of any one of claims 1 to 5, wherein the second valve is a column valve, optionally

wherein the first chromatography column is a bind & elute chromatography column and the second chromatography column is a flow-through chromatography column, optionally

wherein the system directs fluid to flow in mode C and in mode A, sequentially, optionally

wherein the first chromatography column is a bind & elute chromatography column and the second chromatography column is a bind & elute chromatography column, optionally

wherein the system directs fluid to flow in mode C, in mode A and in mode B, sequentially.

10~~11~~. The system of any one of the preceding claims, wherein the system further comprises one or more valve, optionally the valve is selected from the group consisting of an injection valve and a column valve.

11~~12~~. The system of any one of the preceding claims, wherein the first chromatography column and/or the second chromatography column is an affinity or non-affinity chromatography, or

wherein the first chromatography column and/or the second chromatography column is an anion exchange chromatography, optionally

wherein the first chromatography column is a high salt tolerant anion exchanger and/or the second chromatography column is a conventional anion exchange chromatography, high salt tolerant anion exchange chromatography and/or an affinity chromatography.

1213. The system of any one of the claims 1 to 910, wherein the first chromatography column is a salt tolerant anion exchanger (Toyopearl NH2 750F), optionally the second chromatography column is a bind & elute chromatography column selected from the group consisting of a conventional anion exchanger, a high salt tolerant anion exchanger, and an affinity chromatography, optionally

wherein the first chromatography column is a salt tolerant anion exchanger (Toyopearl NH2-750F) and/or the second chromatography column is selected from the group consisting of conventional anion exchanger (Toyopearl Super Q-650, Capto Q, Q Sepharose, Mustang® Q, Sartobind Q), salt tolerant anion exchanger (HyperCel Star AX, Poros XQ), and affinity chromatography (Alpha-1 Antitrypsin Select).

1314. A method of purifying a target from a sample comprising

a) providing a system according to any one of the preceding claims, and
b) collecting the target from the system.

1415. The method of claim 1314, (i) wherein the first chromatography column is a flow-through chromatography column or a bind & elute chromatography column and the second chromatography column is a flow-through chromatography column or a bind & elute chromatography column, optionally

wherein the first chromatography column is a flow-through chromatography column and the second chromatography column is a bind & elute chromatography column, optionally

wherein when the system directs fluid to flow in mode A and in mode B, sequentially, the target is collected in mode B by disassociating the target from the second chromatography column, or

(ii) wherein the first chromatography column is a bind & elute chromatography column and the second chromatography column is a flow-through chromatography column, optionally

wherein when the system directs fluid to flow in mode C and in mode A, sequentially, the target is collected in mode A by dissociating target from the first chromatography column and flow through the second chromatography column, or

(iii) wherein the first chromatography column is a bind & elute chromatography column and the second chromatography column is a bind & elute chromatography column, optionally

wherein when the system directs fluid to flow in mode C, in mode A and in mode B, sequentially, the target is collected in mode B by disassociating the target from the second chromatography column.

15~~16~~. The method of any one of the claims 13~~14~~ to 14~~15~~, wherein the target is a target protein, optionally an acidic protein.

16~~17~~. The method of claim 13~~14~~ to 15~~16~~, wherein the target is a recombinant acidic protein, optionally an alpha-1 anti-trypsin (A1AT).

~~18. The system of any one of claims 1 to 13 or the methods of any one of claims 14 to 16, wherein the purification is no less than about 90% pure, or no less than about 91%, or no less than about 92%, or no less than about 93%, or no less than about 94% or no less than about 95%, or no less than about 96%, or no less than about 97%, or no less than about 98%, or no less than about 99%.~~

17~~19~~. The method of any one of claims 13~~14~~ to 17~~18~~, wherein the sample is a supernatant (such as cell culture supernatant).

1820. The method of any one of claims 1314 to 1719 or system of any one of claims 1 to 13, wherein the first valve, the second valve, the first chromatography column and the second chromatography column are integrated in a single closed- and self-contained apparatus.

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