Claims

1. A method for large-scale purification of recombinant viral vectors, wherein the method comprises the following steps:

(a) providing a raw material, which comprises recombinant viral vectors to be purified and is a feed liquid;

(b) carrying out a microfiltration treatment on the feed liquid to obtain a microfiltered filtrate, which comprises the recombinant viral vectors; wherein the microfiltration treatment is conducted using a microfiltration hollow fiber column, wherein the microfiltration hollow fiber column is a microfiltration membrane with a cut-off value of 0.4 to 1.0 μm;

(c) concentrating the filtrate to obtain a concentrated filtrate, wherein the concentrating is conducted using an ultrafiltration hollow fiber column with a cut-off value of 200 K to 1000 K;

(d) purifying the filtrate by chromatography to obtain a crude pure product comprising the recombinant viral vectors; and

(e) subjecting the crude pure product to liquid exchange and purification to obtain purified recombinant viral vectors;

wherein the chromatography in step (d) is selected from anion-exchange chromatography, size exclusion chromatography and multimodal composite resin chromatography, or a combination thereof,

wherein the recombinant viral vectors are recombinant lentiviral vectors.

2. The method according to claim 1, wherein anionic resin for the anion-exchange chromatography is selected from: Capto Q, Capto ImpRes and Capto DEAE.

3. The method according to claim 1, wherein the purification by chromatography step comprises performing primary purification by anion-exchange chromatography first and then performing purification by multimodal composite resin chromatography.

4. The method according to claim 1, wherein in step (d), the purified recombinant lentiviral vectors have one or more of the following features:

(p1) the biological titer of the recombinant lentiviral vectors is about $1.06x10^9$ Tu/mL;

(p2) BSA <50 ng/mL;

(p3) endotoxin <1 EU/mL.

5. The method according to claim 1, wherein in step (c), concentration is conducted through ultrafiltration.

6. Recombinant lentiviral vectors purified by the method described in claim 1.

7. A preparation, wherein the preparation comprises the purified recombinant lentiviral vectors described in claim 6.

8. A purification device used in the method described in claim 1, wherein the purification device comprises:

(S1) an optional first container for holding raw material of recombinant lentiviral vectors to be purified;

(S2) a microfiltration unit, for performing microfiltration treatment of the recombinant lentiviral vectors to be purified, so as to obtain a microfiltered filtrate;

(S3) an optional concentration unit, for concentrating the filtrate, so as to obtain a concentrated filtrate;

(S4) a chromatographic purification unit, for purifying by chromatography the filtrate from the microfiltration unit or from the concentration unit, so as to obtain purified recombinant lentiviral vectors; and

(S5) a collection unit, for collecting the purified recombinant lentiviral vectors.

9. The purification device according to claim 8, wherein the chromatographic purification unit includes: a size exclusion chromatography unit and an anion-exchange chromatography unit.

10. The purification device according to claim 8, wherein the purification device further comprises:

(S6) a ribozyme treatment unit, comprising an addition device for adding ribozyme.