CLAIMS

1. A method for providing single-stranded RNA (ssRNA), comprising:

(i) providing an RNA preparation, wherein the RNA preparation comprises ssRNA and has been or is produced by *in vitro* transcription by using a DNA-dependent RNA polymerase;

(ii) contacting the RNA preparation with a cellulose material under conditions which allow binding of double-stranded RNA (dsRNA) to the cellulose material and do not allow binding of the ssRNA to the cellulose material; and

(iii) separating the ssRNA from the cellulose material under conditions which allow binding of the dsRNA to the cellulose material and do not allow binding of the ssRNA to the cellulose material to remove dsRNA from the RNA preparation,

wherein in step (ii) the RNA preparation is provided as a liquid comprising the ssRNA and a first buffer and/or the cellulose material is provided as a suspension in the first buffer, wherein the first buffer comprises water, ethanol and a salt in a concentration which allows binding of the dsRNA to the cellulose material and which does not allow binding of the ssRNA to the cellulose material, and the concentration of ethanol in the first buffer is 14 to 20% (v/v), and wherein the ssRNA is mRNA.

2. The method of claim 1, wherein step (ii) comprises mixing the RNA preparation comprising ssRNA with the cellulose material under shaking and/or stirring; or
wherein step (ii) comprises mixing the RNA preparation comprising ssRNA with the cellulose material under shaking and/or stirring for at least 5 min.

3. The method of claim 1 or 2, wherein in step (iii) the mixture of the RNA preparation, the cellulose material, and the first buffer is provided in a tube and step (iii) comprises (1) applying gravity or centrifugal force to the tube such that the liquid and solid phases are separated; and (2) either collecting the supernatant comprising ssRNA or removing the cellulose material; or
wherein in step (iii) the mixture of the RNA preparation, the cellulose material, and the first buffer is provided in a spin column or filter device and step (iii) comprises (1') applying gravity, centrifugal force, pressure, or vacuum to the spin column or filter device such that the liquid and solid phases are separated; and (2') collecting the flow through comprising ssRNA.

4. The method of any one of claims 1 to 3, wherein steps (ii) and (iii) are repeated once or two or more times, wherein the ssRNA preparation obtained after step (iii) of one cycle of steps (ii)

and (iii) is used as RNA preparation in step (ii) of the next cycle and in step (ii) of each cycle of steps (ii) and (iii) fresh cellulose material is used.

5. The method of any one of claims 1 to 4, wherein the first buffer comprises a buffering substance in a concentration of 5 to 40 mM.

6. The method of claim 5, wherein the buffering substance is tris(hydroxymethyl)aminomethane (TRIS).

7. The method of any one of claims 1 to 6, wherein the concentration of the salt in the first buffer is 15 to 70 mM or 20 to 60 mM.

8. The method of any one of claims 1 to 7, wherein the first buffer comprises a chelating agent, or wherein the first buffer comprises a chelating agent in a concentration of 10 to 50 mM.

9. The method of any one of claims 1 to 8, wherein the first buffer comprises:

(i) 14 to 20% (v/v) ethanol;
5 to 40 mM TRIS; and
15 to 70 mM salt; or

(ii) 14 to 20% (v/v) ethanol;
5 to 40 mM TRIS;
15 to 70 mM salt; and
10 to 50 mM chelating agent.

10. The method of claim 8 or 9, wherein the chelating agent is EDTA.

11. The method of claim 5, wherein the buffering substance is 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid (HEPES).

12. The method of claim 11, wherein the concentration of the salt in the first buffer is 100 to 150 mM or 110 to 140 mM.

13. The method of claim 11 or 12, wherein the first buffer comprises:
14 to 20% (v/v) ethanol;
5 to 40 mM HEPES; and
110 to 140 mM salt.

14. The method of any one of claims 1 to 13, wherein the concentration of ethanol in the first buffer is 14 to 16% (v/v), and/or the salt in the first buffer is sodium chloride.

15. The method of any one of claims 1 to 14, wherein

(i) the RNA is produced or has been produced by using a DNA-dependent RNA polymerase selected from the group consisting of T3, T7 and SP6 RNA polymerases,

(ii) prior to step (ii) the RNA preparation is subjected to at least one pre-purification treatment,

(iii) prior to step (ii) the RNA preparation is subjected to at least one pre-purification treatment, wherein the at least one pre-purification treatment comprises one or more of the following: precipitation of nucleic acids; binding of nucleic acids to magnetic beads; ultrafiltration; and degradation of DNA, and/or

(iv) prior to step (ii) the RNA preparation is subjected to at least one pre-purification treatment, wherein the at least one pre-purification treatment comprises precipitation of nucleic acids which is performed by using lithium chloride, or wherein the at least one pre-purification treatment comprises degradation of DNA which is performed by using duplex-specific nuclease (DSN).

16. The method of any one of claims 1 to 15, wherein the ssRNA has a length of at least 2700 nt.

17. The method of any one of claims 1 to 16, wherein

(i) the cellulose material comprises cellulose fibers of a grade suitable for use as a partition chromatography reagent,

(ii) prior to contacting with the RNA preparation in step (ii) the cellulose material is provided as a washed cellulose material, and/or

(iii) prior to contacting with the RNA preparation in step (ii) the cellulose material is provided as a washed cellulose material, wherein the washing of the cellulose material includes (I) mixing the cellulose material with a washing solution under shaking and/or stirring; and (II) either removing the liquid or collecting the cellulose material; and optionally (III) repeating steps (I) and (II) once or two or more times, wherein, preferably, the washing solution has the composition of the first buffer defined in any one of claims 1 and 5 to 14.

18. The method of any one of claims 1 to 17, wherein the provided ssRNA is suitable for use in therapy.

19. The method of any one of claims 1 to 18, wherein a first cycle of steps (ii) and (iii) is effective in removing at least 70% of dsRNA contained in the RNA preparation used in step (ii) of the first cycle of steps (ii) and (iii).