CLAIMS

1. Use of an injectable mRNA nanoparticle comprising
    (i) a first mRNA encoding a tumor-specific antigen;
    (ii) a second mRNA encoding an immunomodulatory agent;
    (iii) a third mRNA encoding a tumor necrosis factor superfamily member 14 (TNFSF14); and
    (iv) a delivery vehicle molecule, wherein the first mRNA, the second mRNA, and third mRNA are encapsulated together by the delivery vehicle molecule,
    in the manufacture of a medicament for intratumoral therapy.

2. Use according to claim 1, wherein the tumor-specific antigen comprises a viral antigen; preferably associated with Human papillomavirus (HPV), Kaposi's sarcoma-associated herpesvirus (KSHV), Epstein–Barr virus (EBV), Merkel cell polyomavirus, Human cytomegalovirus (CMV), or any combination thereof.

3. Use according to claim 1 or 2, wherein the delivery vehicle molecule comprises an amino-lipidated peptoid.

4. Use according to any of claims 1-3, wherein the second mRNA encoding the immunomodulatory agent encodes: a checkpoint inhibitor, an immunosuppression antagonist, a pro-inflammatory agent, or any combination thereof; preferably wherein the second mRNA encoding the immunomodulatory agent encodes a pro-inflammatory cytokine; more preferably wherein the pro-inflammatory cytokine is one of: (IL), IL-1, IL-2, IL-12, IL-17, IL-18, IFN-γ, and TNF-α.

5. Use according to claim 4, wherein the pro-inflammatory cytokine is interleukin-12 (IL-12).

6. Use according to claims 1-5, wherein the mRNA nanoparticle further includes an immunostimulator; preferably an immunostimulator that comprises a CpG oligodeoxynucleotides.

7. Use according to any of claims 1-6, wherein the intratumoral therapy comprises repeating the intratumoral injection one or more times with a wait between injections, wherein the wait is between about 1 and about 14 days.

8. Use according to any of claims 1-7, in the manufacture of a medicament for the treatment of cervical cancer.

9. An mRNA treatment nanoparticle, the nanoparticle comprising:

(i) a first mRNA encoding a tumor-specific antigen;

(ii) a second mRNA encoding an immunomodulatory agent;

(iii) a third mRNA that encodes a tumor necrosis factor superfamily member 14 (TNFSF14); and

(iv) a delivery vehicle molecule, wherein the first mRNA, second and third mRNA are encapsulated together by the delivery vehicle molecule.

10. The mRNA treatment nanoparticle of claim 9, wherein the delivery vehicle molecule comprises an amino-lipidated peptoid.

11. The mRNA treatment nanoparticle of claim 9 or 10, wherein the second mRNA encodes an interleukin-12 that is at least about 80% identical to the nucleotide sequence of SEQ ID NO: 5.

12. The mRNA treatment nanoparticle of any of claims 9-11, wherein the mRNA treatment nanoparticle further includes an immunostimulator; preferably wherein the immunostimulator comprises a CpG oligodeoxynucleotide.

13. A method, the method comprising:

performing *in vitro* transcription of a first mRNA encoding a tumor-specific antigen from a template in a microfluidic path device;

purifying the first mRNA;

performing *in vitro* transcription of a second mRNA encoding a first immunomodulatory agent in the microfluidic path device;

purifying the second mRNAs in the microfluidic path device; and

encapsulating together the first mRNA and the second mRNA with a delivery vehicle molecule in the microfluidic path device to form an mRNA treatment nanoparticle.

14. The method of claim 13 further comprising performing *in vitro* transcription of a third mRNA encoding a second immunomodulatory agent in the microfluidic path device; purifying the third mRNAs in the microfluidic path device; prior to encapsulating

together the first mRNA, the second mRNA and third mRNA with a delivery vehicle molecule in the microfluidic path device to form an mRNA treatment nanoparticle.

15. The method of claim 13 or 14 comprising:

performing *in vitro* transcription of a first mRNA encoding a tumor-specific antigen from a template in a first chamber of a microfluidic path device;

purifying the first mRNA;

performing *in vitro* transcription of a second mRNA encoding a first immunomodulatory agent in a second chamber of the microfluidic path device;

purifying the second mRNAs in the microfluidic path device;

performing *in vitro* transcription of a third mRNA encoding a second immunomodulatory agent in a third chamber of the microfluidic path device;

purifying the third mRNAs in the microfluidic path device; and

encapsulating together the first mRNA, the second mRNA and the third mRNA with a delivery vehicle molecule in the microfluidic path device to form an mRNA treatment nanoparticle.

16. The method of any of claims 14 or 15, wherein each of the purifying the first mRNA, the purifying the second mRNA and the purifying the third mRNA further comprises the purifying in one or more reactors on the microfluidic path device.

17. The method of claim 13 to 16, wherein the delivery vehicle molecule comprises an amphipathic molecule; preferably wherein the amphipathic molecule comprises an amino-lipidated peptoid.

18. The method of any of claims 13 to 16, wherein the second mRNA encoding an immunomodulatory agent encodes anti-CTLA-4; or wherein the second mRNA encoding an immunomodulatory agent encodes a TGF-beta antagonist; or wherein the second mRNA encoding an immunomodulatory agent encodes a single chain interleukin-12 (IL-12).

19. The method of any of claims 13 to 16, wherein combining the first mRNA and the second mRNA comprises adding an immunostimulator in the microfluidic path device; preferably wherein the immunostimulator comprises a CpG oligodeoxynucleotides.

20. Use according to claim 1 and the nanoparticle according to claim 9 wherein the first mRNA encoding a tumor-specific antigen is HPV16 and/or the second mRNA encoding

an immunomodulatory agent is IL-12; preferably wherein the first mRNA encoding a tumor-specific antigen is HPV16 and the second mRNA encoding an immunomodulatory agent is IL-12; more preferably wherein the first mRNA encoding a tumor-specific antigen is HPV16 E6E7 and the second mRNA encoding an immunomodulatory agent is IL-12.