CLAIMS

1. A composition to induce differentiation of a somatic cell into a specialized cell type of interest, comprising at least one specialized cell type-inducing agent conjugated to a central nanoparticle.

2. The composition of Claim 1, wherein the at least one specialized cell type-inducing agent is conjugated to the central nanoparticle through a first functionalized group on the nanoparticle.

3. The composition of Claim 1, wherein the specialized cell type is a cardiomyocyte-like cell (iCM), hepatocyte, neural, beta cell, blood progenitor cell, myocyte, osteoblast, or other cell type.

4. The composition of Claim 1, wherein the at least one specialized cell type-inducing agent comprises at least one of the agents listed in Table 1, or a functional domain thereof.

5. The composition of one of Claims 1-4, wherein the at least one specialized cell type-inducing agent comprises two, three, four, five, or more of the molecules listed in Table 1, or a functional domain thereof.

6. The composition of one of Claim 4-5, wherein the specialized cell type is a cardiomyocyte-like cell (iCM) and the one or more specialized cell type-inducing agents are selected from Gata4, MEF2C, TBX5, MESP1, Hand2, MYOCD, miR-1, and miR-133.

7. The composition of one of Claims 1-6, further comprising a penetrating peptide (CPP) conjugated to the nanoparticle through a second functionalized group on the nanoparticle.

8. The composition of one of Claims 1-7, wherein the nanoparticle has a size below about 100, 75, 50, 40, or 30 nm in diameter.

9. The composition of one of Claims 1-8, wherein the central nanoparticle comprises iron or gold molecules, or wherein the central nanoparticle comprises polymeric molecules.

10. The composition of one of Claims 1-9, wherein the nanoparticle comprises a polymer coating.

11. The composition of one of Claims 7-10, wherein the nanoparticle comprises a polymer coating and the first and/or second functional groups are attached to the polymer coating.

12. The composition of one of Claims 2-11, further comprising a first linker molecule linking the first functional group and the at least one specialized cell type inducing agent listed in Table 1.

13. The composition of one of Claim 7-12, further comprising a second linker molecule linking the second functional group and the CPP.

14. The composition of Claim 13, wherein the first linker molecule has a first length, wherein the second linker molecule has a second length, and wherein the second length is greater than the first length.

15. The composition of Claims 7-14, wherein the CPP comprises about 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or more basic amino acids, or wherein the CPP comprises 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or more contiguous basic amino acids.

16. A cell comprising the composition of any one of Claims 1-15.

17. The cell of Claim 16, wherein the cell is derived from a somatic cell, or wherein the cell is an induced specialized cell type of interest.

18. The cell of Claim 17, wherein the somatic cell is a fibroblast, or wherein the induced specialized cell type of interest is a cardiomyocyte-like cell (iCM), hepatocyte, neural, beta cell, blood progenitor cell, myocyte, osteoblast, or other cell type.

19. The cell of any one of Claims 16-18, wherein the cell is a human cell.

20. A method of inducing differentiation of a somatic cell into a specialized cell type of interest, comprising contacting the somatic cell with a composition of any one of Claims 1-21, wherein the specialized cell type of interest is listed in Table 1, such as a cardiomyocyte-like cell (iCM), hepatocyte, neural, beta cell, blood progenitor cell, myocyte, osteoblast, or other cell type.

21. The method of Claim 20, wherein the somatic cell is a fibroblast, or wherein the somatic cell is a human cell.

22. The method of one of Claims 20-21, wherein the somatic cell is contacted *in vitro* under culture conditions sufficient to permit differentiation of the somatic cell.

23. A method of screening a candidate pharmaceutical composition *in vitro* for activity in an induced specialized cell type of interest, comprising:

contacting the induced specialized cell with the candidate pharmaceutical composition; and

observing the induced specialized cell for an indication of activity.

24. The method of Claim 23, wherein the induced specialized cell is selected from one of the cell types listed in Table 1, such as a cardiomyocyte-like cell (iCM), hepatocyte, neural, beta cell, blood progenitor cell, myocyte, osteoblast, or other cell type.

25. The method of one of Claims 23-34, further comprising inducing generation of the specialized cell from a somatic cell.

26. The method of one of Claims 23-25, wherein the specialized cell is induced according to the method recited in one of Claims 28-32.

27. The method of one of Claims 25 and 26, wherein the somatic cell is obtained from a normal subject or a subject with a specific pathological condition, and the indication of activity is an indication of activity of the pharmaceutical composition for treatment of the pathological condition in the subject.