CLAIMS

What is claimed is:

1. A functionalized biocompatible nanoparticle capable of penetrating through a mammalian cell membrane and delivering intracellularly ~~a plurality of~~one or more bioactive molecules for modulating a cellular function, said functionalized biocompatible nanoparticle comprising:

a central nanoparticle ranging in size from 5 to 50 nm and having a polymer coating thereon~~,~~ and

~~a plurality of~~one or more functional groups that are covalently attached to ~~the~~said polymer coating, wherein ~~the plurality of~~said one or more bioactive molecules are attached to ~~the plurality of~~said one or more functional groups, and wherein ~~the plurality of~~said one or more bioactive molecules include ~~at least a~~one or more peptides that are each capable of penetrating through said mammalian cell membrane and entering into said cell and ~~a~~one or more proteins that are each capable of modulating a cellular function within said cell, and wherein ~~the~~each of said peptides is attached to said nanoparticle independently from each of said proteins~~capable of penetrating through the mammalian cell membrane and entering into the cell, and wherein the protein is capable of providing a new functionality within the cell~~.

2. The functionalized biocompatible nanoparticle of claim 1 wherein ~~the~~said nanoparticle comprises iron.

3. The functionalized biocompatible nanoparticle of claim 2 wherein ~~the~~one or more of said peptides ~~is~~are attached to ~~the protein~~said nanoparticle by a linker molecule.

4. The functionalized biocompatible nanoparticle of claim 3 wherein ~~the~~one or more of said peptides and ~~the~~one or more of said proteins are ~~each~~ attached to ~~the~~said nanoparticle by way of one or more interposing linker molecules.

5. The functionalized biocompatible nanoparticle of claim 4, wherein the linker that attaches said one or more peptides to said nanoparticle is of a different length than the linker that attaches one or more of said proteins to said nanoparticle.

~~5~~6. The functionalized biocompatible nanoparticle of claim 1 wherein ~~the~~one or more of said peptides includes five to nine basic amino acids.

~~6~~7. The functionalized biocompatible nanoparticle of claim 1 wherein ~~the~~one or more of said peptides includes nine or more basic amino acids.

~~7~~8. The functionalized biocompatible nanoparticle of claim ~~5~~6 wherein ~~the~~one or more of said proteins is a transcription factor.

~~8~~9. The functionalized biocompatible nanoparticle of claim ~~7~~8 wherein ~~the~~said transcription factor is selected from the group consisting of Oct4, Sox2, Nanog, Lin28, cMyc, and Klf4.

~~9~~10. Use of a functionalized biocompatible nanoparticle according to claim 1 for the manufacture of a medicament for changing a cellular functionality within a mammalian cell.

~~10~~11. The use according to claim ~~9~~10, wherein ~~the~~said changing of ~~the~~said cellular functionality involves a change in a physico-chemical property of ~~the~~said cell.

~~11~~12. The use according to claim ~~9~~10, wherein ~~the~~said changing of ~~the~~said cellular functionality involves a change in a proliferative property of ~~the~~said cell.

~~12~~13. The use according to claim ~~9~~10, wherein ~~the~~said changing of ~~the~~said cellular functionality involves a change in surviving ability of ~~the~~said cell.

~~13~~14. The use according to claim ~~9~~10, wherein ~~the~~said changing of ~~the~~said cellular functionality involves a change in morphological phenotypical property of ~~the~~said cell.

~~14~~15. The use according to claim ~~9~~10, wherein the changing of the cellular functionality involves an acquired ability of the cell to make a new cell type including a stem cell or a more ~~specialized~~differentiated cell type.