CLAIMS

1. A nanoparticle or nanoparticles' aggregate for use in prevention or treatment of a neuronal disease in a subject by modulating electrical polarization of neurons in the subject when the nanoparticle or nanoparticles' aggregate is exposed to a light source, a magnetic field, or an ultrasound source, wherein i) when the nanoparticle or nanoparticles' aggregate is exposed to a light source, the nanoparticle's or nanoparticles' aggregate's material is selected from a material enabling opto-electric transduction, opto-thermal transduction or opto-optical transduction, ii) when the nanoparticle or nanoparticles' aggregate is exposed to a magnetic field, the nanoparticle's or nanoparticles' aggregate's material is selected from a material enabling magneto-electric transduction or magneto-thermal transduction, iii) when the nanoparticle or nanoparticles' aggregate is exposed to an ultrasound source, the nanoparticle's or nanoparticles' aggregate's material is a material enabling acousto-electric transduction, and wherein the nanoparticle or nanoparticles' aggregate's surface is either neutrally charged in the absence of any coating or coated with a hydrophilic agent conferring a neutral surface charge to the nanoparticle or nanoparticles' aggregate, the neutral charge being of about -10 mV to +10mV.

2. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the material enabling opto-electric transduction is a semiconductor material with a band gap Eg below 3.0 eV.

3. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the material enabling opto-thermal transduction is a plasmonic metal material.

4. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the material enabling opto-optical transduction is a lanthanide element-doped material selected from a lanthanide-doped oxide, a lanthanide-doped mixed-oxide, a lanthanide-doped metal-phosphate, and a lanthanide-doped metal-vanadate.

5. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the material enabling magneto-electric transduction is $CoFe_2O_4$@$BaTiO_3$.

6. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the material enabling magneto-thermal transduction is a superparamagnetic material.

7. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the material enabling acousto-electric transduction is a piezoelectric material.

8. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the hydrophilic agent conferring a neutral surface charge to the nanoparticle or nanoparticles' aggregate displays a functional group selected from an alcohol (R-OH), an aldehyde (R-COH), a ketone (R-CO-R), an ester (R-COOR), an acid (R-COOH), a thiol (R-SH), a saccharide, an anhydride (RCOOOC-R), and a pyrrole.

9. The nanoparticle or nanoparticles' aggregate for use according to claim 1, wherein the hydrophilic agent according to claim 8 is selected from a poly(lactic acid), a polyhydroxyalkanoic acid, a polyether, a polyethylene oxide, a polyethylene glycol, a polyvinylalcohol, a polycaprolactone, a polyvinylpyrrolidone, a polysaccharide, a polypyrrole, a cyclodextrin, a thioglucose, a 2-mercaptoethanol, a 1-thioglycerol, a thiodiglycol, a hydroxybutyric acid, a hydroxymethyltriethoxysilane, a fructose 6-phosphate and a glucose 6-phosphate.

10. A composition for use in prevention or treatment of a neuronal disease in a subject by modulating electrical polarization of neurons in the subject when the nanoparticle or nanoparticles' aggregate is exposed to a light source, a magnetic field, or an ultrasound source, wherein the composition comprises nanoparticles and/or nanoparticles' aggregates and a pharmaceutically acceptable support, wherein i) when the nanoparticle or nanoparticles' aggregate is exposed to a light source, the nanoparticle's or nanoparticles' aggregate's material is selected from a material enabling opto-electric transduction, opto-thermal transduction or opto-optical transduction, ii) when the nanoparticle or nanoparticles' aggregate is exposed to a magnetic field, the nanoparticle's or nanoparticles' aggregate's material is selected from a material enabling magneto-electric transduction or magneto-thermal transduction, iii) when the nanoparticle or nanoparticles' aggregate is exposed to an ultrasound source, the nanoparticle's or nanoparticles' aggregate's material is a material enabling acousto-electric transduction, and wherein the nanoparticle or nanoparticles' aggregate's surface is either neutrally charged in the absence of any coating or coated with a hydrophilic agent conferring a neutral surface charge to the nanoparticle or nanoparticles' aggregate, the neutral charge being of about -10 mV to +10mV.

11. The composition for use according to claim 10, wherein the composition comprises at least two distinct nanoparticles and/or nanoparticles' aggregates, each nanoparticle or nanoparticles' aggregate consisting of a distinct material selected from a material enabling opto-electric transduction, opto-thermal transduction, opto-optical transduction, magneto-electric transduction, magneto-thermal transduction or acousto-electric transduction, and the

nanoparticle or nanoparticles' aggregate's surface being coated with a hydrophilic agent conferring a neutral surface charge to the nanoparticle or nanoparticles' aggregate.

12. A kit comprising at least two distinct nanoparticles and/or nanoparticles' aggregates, each nanoparticle or nanoparticles' aggregate consisting of a distinct material selected from a material enabling opto-electric transduction, opto-thermal transduction, opto-optical transduction, magneto-electric transduction, magneto-thermal transduction or acousto-electric transduction, and the nanoparticle or nanoparticles' aggregate's surface being either neutrally charged in the absence of any coating or coated with a hydrophilic agent conferring a neutral surface charge to the nanoparticle or nanoparticles' aggregate, the neutral charge being of about -10 mV to +10mV.

13. The kit according to claim 12 for use in prevention or treatment of a neuronal disease in a subject by modulating electrical polarization of neurons in the subject when the subject is exposed to a light source, a magnetic field, or an ultrasound source.

14. The nanoparticle or nanoparticles' aggregate for use according to anyone of claims 1 to 9, the composition for use according to claim 10 or 11, or the kit according to claim 12 or claim 13, wherein the subject is a human being.