CLAIMS

1. Use of a nanoparticle or nanoparticles' aggregate in the manufacture of a medicament for 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 semiconductor material with a band gap Eg below 3.0 eV as a material enabling opto-electric transduction, a plasmonic metal material as a material enabling opto-thermal transduction or 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 as a material enabling 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 $CoFe_2O_4$@$BaTiO_3$ as a material enabling magneto-electric transduction and a superparamagnetic material as a material enabling 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 piezoelectric material as 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 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.

3. The use according to claim 2, wherein the hydrophilic agent according to claim 2 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.

4. Use of a composition comprising nanoparticles and/or nanoparticles' aggregates and a pharmaceutically acceptable support in the manufacture of a medicament for 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 semiconductor material with a band gap Eg below 3.0 eV as a material enabling opto-electric transduction, a plasmonic metal material as a material enabling opto-thermal transduction and 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 as a material enabling 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 $CoFe_2O_4$@$BaTiO_3$ as a material enabling magneto-electric transduction and a superparamagnetic material as a material enabling 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 piezoelectric material as 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.

5. The use according to claim 4, 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.

6. 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 semiconductor material with a band gap Eg below 3.0 eV as a material enabling opto-electric transduction, a plasmonic metal material as a material enabling opto-thermal transduction, 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 as a material enabling opto-optical transduction, $CoFe_2O_4$@$BaTiO_3$ as a material enabling magneto-electric transduction, a superparamagnetic material as a material enabling magneto-thermal transduction or a piezoelectric material as a material enabling 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.

7. The kit according to claim 6 for use in 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.

8. The use according to anyone of claims 1 to 5, or the kit according to claim 6 or claim 7, wherein the subject is a human being.