CLAIMS

1. An in vitro or ex vivo method for incubating a population of mononuclear phagocytes isolated from biological samples characterized in that,

   the incubation takes place under hypoxic conditions,

   and the culture medium comprises factors released from solid tumor or tumor explants or tumor cell lines, wherein the mononuclear phagocytes are macrophages.

2. The method according to claim 1, wherein the incubated mononuclear phagocyte population is an in vitro culture of monocytes isolated from biological samples and/or wherein the culture medium comprises factors capable of differentiating monocytes into macrophages, preferably the Macrophage Colony-Stimulating Factor (M-CSF).

3. The method according to claim 1 or 2, wherein the population is incubated for from 6 hours or 12 hours to 20 days, more preferably 6 hours-10 days or preferably 6 hours-72 hours or 3-8 days, even more preferably 18 hours-24 hours or 6 days, even more preferably 18 hours or 7 days.

4. The method according to one of the preceding claims, wherein the culture medium comprises a tumor supernatant said supernatant being obtained from cultures of solid tumor, tumor explants or tumor cell lines, preferably from fibrosarcoma or glioma, or a medium conditioned from the tumor (CTM) produced from tumor cell lines, tumor explants, or solid tumor, or from resections of dissociated and plated in vitro tumors, preferably for a period of 6 hours-20 days, more preferably of 12 hours-72 hours.

5. The method according to one of the preceding claims, where the culture medium comprises a cell culture medium, Eagle's minimal essential medium or derivatives thereof, and / or Roswell Park Memorial Institute (RPMI) 1640, and / or Media 199 and / or Fischer's medium and/or or Iscove’s Modified Dulbecco’s Medium (IMDM), and 1-99%, preferably 10-90%, more preferably 30-50%, even more preferably 30% or 50%, medium conditioned from the tumor (CTM) or tumor supernatant.

6. An isolated macrophage which expresses at least MT2A, and which:

i) expresses at least one of the following genes: CXCR4, CYTIP, and SLC2A3; and/or

ii) expresses low/no level of at least one of the following genes: PLXNA2, HSPH1, CYCS

and TIGAR, preferably TIGAR, wherein for low level is intended a gene expression level which is at least five fold lower than the level of expression of the housekeeping gene beta-actin.

7. The macrophage of claim 6 wherein said macrophage:

i) expresses: CXCR4, CYTIP, SLC2A3 and MT2A; and

ii) expresses low/no level: PLXNA2, HSPH1, CYCS and TIGAR, wherein for low level is intended a gene expression level which is at least five fold lower than the level of expression the housekeeping gene beta-actin.

8. The macrophage of any one of claims 6-7 wherein said macrophage expresses CXCR4, MT2A MT1x and expresses low/no level of TIGAR.

9. A population of macrophages comprising at least one macrophage of any one of claims 6-8.

10. The macrophage of any one of claims 6-8 or the population of macrophages of claim 9 for medical use preferably wherein the macrophages are administered from 2 days to 60 days or to 1 year after the lesion, preferably 4-21 or 15-60 days after the lesion.

11. The macrophage of any one of claims 6-8 or the population of macrophages of claim 9 or 10 for use in cell therapy and/or regenerative medicine, preferably in tissue or cell repair, in tissue or cell regeneration, in tissue remodeling, in the treatment and / or in the repair and / or in the healing of wounds, tissue loss in wounds, surgical ulcers, diabetic wounds, in the treatment of conditions of degeneration, including neurodegeneration, retinal degeneration, degeneration due to genetic diseases (such as ALS), autoimmune diseases (arthritis, collagenopathies) or even diabetes in which degeneration of pancreatic islets occurs, in the treatment and / or resolution of inflammation, of inflammation of the tissues, in the treatment of damages, damaged tissues and the like, preferably in the treatment of lesions characterized by loss of central nervous system embedded tissue, preferably in the treatment of a spinal lesion or injury, such as a severe spinal injury, or spinal cord injury, preferably a severe or contusive spinal cord injury, preferably wherein the macrophages are administered from 2 days to 60 days or to 1 year after the lesion, preferably 4-21 or 15-60 days after the lesion.

12. Pharmaceutical composition comprising the macrophage of any one of claims 6-8 or the population of macrophages of claim 9 or 10, and at least one pharmaceutically acceptable excipient.