CLAIMS

1. A method of detecting a therapeutic exosome, the method comprising detecting an immunodulatory activity of an exosome.

2. A method according to Claim 1, in which the immunomodulatory activity is detected by detecting activity of a protein set out in Table D10.

3. A method according to Claim 1 or 2, in which the exosome is capable of: (i) inhibiting complement mediated cell lysis; or (ii) reducing infarct size for example as assayed in a mouse or pig model of myocardial ischemia and reperfusion injury, or which is capable of reducing oxidative stress for example as assayed in an *in vitro* assay of hydrogen peroxide (H_2O_2)-induced cell death, or both (i) and (ii), if an immunomodulatory activity is detected.

4. A method according to any of Claims 1, 2 or 3, in which the therapeutic activity comprises cardioprotective activity.

5. A method according to any preceding claim, in which the therapeutic activity is against one or more diseases selected from the group consisting of: cardiac failure, bone marrow disease, skin disease, burns and degenerative diseases such as diabetes, Alzheimer's disease, Parkinson's disease, cancer, myocardial infarction, a cutaneous wound, a dermatologic disorder, a dermatological lesion, dermatitis, psoriasis, condyloma, verruca, hemangioma, keloid, skin cancer, atopic dermatitis, Behcet disease, chronic granulomatous disease, cutaneous T cell lymphoma, ulceration, a pathological condition characterised by initial injury inducing inflammation and immune dysregulation leading to chronic tissue remodeling including fibrosis and loss of function, renal ischemic injury, cystic fibrosis, sinusitis and rhinitis or an orthopaedic disease.

6. A method comprising the steps of: (a) isolating an exosome from a mesenchymal stem cell conditioned medium (MSC-CM), optionally comprising separating the exosome from other components based on molecular weight, size, shape, composition or biological activity, and (b) detecting an activity set out in Claim 1 in the isolated exosome, preferably by detecting the activity of one or more proteins set out in Claim 2.

7. A method of purifying an exosome, the method comprising: (a) obtaining a mesenchymal stem cell conditioned medium (MSC-CM); (b) concentrating the mesenchymal stem cell conditioned medium, for example by ultrafiltration over a >1000 kDa membrane; (c)

subjecting the concentrated mesenchymal stem cell conditioned medium to size exclusion chromatography, such as using a a TSK Guard column SWXL, 6 x 40 mm or a TSK gel G4000 SWXL, 7.8 x 300 mm column; (d) selecting UV absorbant fractions, for example, at 220 nm, that exhibit dynamic light scattering, such as detected by a quasi-elastic light scattering (QELS); in which step (d) for example comprises collecting fractions which elute with a retention time of 11-13 minutes, such as 12 minutes; and detecting an activity set out in Claim 1 in the exosome, preferably by detecting the activity of one or more proteins set out in Claim 2.

CLAIMS

1. A method of determining if a mesenchymal stem cell exosome comprises therapeutic activity, such that the exosome may be used to enhance tissue repair or inhibit disease progression in an autoimmune disease, the method comprising detecting immunomodulatory activity of the exosome, the immunomodulatory activity being detected by detecting activity of a protein selected from the group consisting of: Biglycan (GenBank Accession Number AK092954), Endoplasmin (GenBank Accession Number AY040226), HSP60 (GenBank Accession Number M34664.1, AAA36022.1), HSP70 (GenBank Accession Number AB023420.1, BAA75062.1), β-defensin 2 (GenBank Accession Number AJ000152), Fibrinogen alpha (NCBI Reference Sequence Number NM_021871), Fibrinogen beta (NCBI Reference Sequence Number NM_001184741), Fibrinogen gamma (NCBI Reference Sequence Number NM_000509), Fibronectin (NCBI Reference Sequence Number NM_212482), Tenascin-C (NCBI Reference Sequence Number NM_002160), S100 protein S100A11 (GenBank Accession Number D38583), S100 protein S100A13 (GenBank Accession Number AK097132), S100 protein S100A8 (GenBank Accession Number BC005928), S100 protein S100A9 (GenBank Accession Number BC047681) and S100 protein S100P (GenBank Accession Number X65614) in or of the exosome, and determining that the exosome comprises therapeutic activity where such activity of a protein is detected.

2. A method according to Claim 1, in which the exosome is produced by a human embryonic stem cell-derived mesenchymal stem cell.

3. A method according to Claim 1, 2 or 3, in which the autoimmune disease is selected from the group consisting of: graft versus host disease (GVHD), Crohn's disease, systemic lupus erythematosus (SLE), diabetes type 1, multiple sclerosis or amyotrophic lateral sclerosis (ALS).

4. A method according to Claim 1 or 2, in which the exosome is capable of activating pro- and anti-inflammatory innate immune responses, inducing suppressive adaptive immune responses via the innate immune system, and/or in which the exosome is not capable of activating inflammatory adaptive immune responses.

5. A method comprising the steps of: (a) isolating an exosome from a mesenchymal stem cell conditioned medium (MSC-CM), optionally comprising separating the exosome from

other components based on molecular weight, size, shape, composition or biological activity, and (b) detecting an activity set out in Claim 1 in the isolated exosome.

6. A method of purifying an exosome, the method comprising: (a) obtaining a mesenchymal stem cell conditioned medium (MSC-CM); (b) concentrating the mesenchymal stem cell conditioned medium, for example by ultrafiltration over a >1000 kDa membrane; (c) subjecting the concentrated mesenchymal stem cell conditioned medium to size exclusion chromatography, such as using a a TSK Guard column SWXL, 6 x 40 mm or a TSK gel G4000 SWXL, 7.8 x 300 mm column; (d) selecting UV absorbant fractions, for example, at 220 nm, that exhibit dynamic light scattering, such as detected by a quasi-elastic light scattering (QELS); in which step (d) for example comprises collecting fractions which elute with a retention time of 11-13 minutes, such as 12 minutes; and detecting an activity set out in Claim 1 in the exosome.