CLAIMS

1. A method of detecting a therapeutic exosome, the method comprising detecting an activity of an exosome selected from the group consisting of: (a) immunodulatory activity; (b) complement inhibition activity; (c) proteasome activity; (d) glycolytic enzyme activity; (e) anti-oxidative activity; (f) extracellular matrix (ECM) modifying activity; (g) NT5E (CD73) ecto-5'-ectonucleotidase activity; (h) ion homeostasis activity; and (i) chaperone activity.

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

3. A method according to Claim 1, in which the activity comprises complement inhibition activity, the complement inhibition activity being detected by detecting activity of a protein set out in Table D1.

4. A method according to Claim 1, in which the activity comprises proteasome activity, the proteasome activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D2.

5. A method according to Claim 1, in which the activity comprises glycolytic enzyme activity, the glycolytic enzyme activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D3.

6. A method according to Claim 1, in which the activity comprises anti-oxidative activity, the anti-oxidative activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D4.

7. A method according to Claim 1, in which the activity comprises extracellular matrix (ECM) modifying activity, the extracellular matrix (ECM) modifying activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D5.

8. A method according to Claim 1, in which the activity comprises NT5E (CD73) ecto-5'-ectonucleotidase activity, the NT5E (CD73) ecto-5'-ectonucleotidase activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D6.

9. A method according to Claim 1, in which the activity comprises ion homeostasis activity, the ion homeostasis activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D7.

10. A method according to Claim 1, in which the activity comprises chaperone activity, the chaperone activity being detected by detecting activity of one or more, preferably all, proteins set out in Table D8.

11. A method according to any preceding claim, in which if an activity is detected, the exosome is likely to be 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).

12. A method according to Claim 11, in which the therapeutic activity comprises cardioprotective activity.

13. A method according to Claim 11, 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.

14. 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 any of Claims 2 to 9.

15. A method of producing 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 any of Claims 2 to 9.

16. A method substantially as hereinbefore described with reference to and as shown in Figures 1 to 13 of the accompanying drawings.

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.