

Claims:

1. A method of monitoring the status of a transplanted organ in the transplant recipients, comprising of:

(i) collection of biological sample from a recipient, a subject who has received an organ transplant from a donor, and identifying one or more markers of the genomic DNA of the recipient having homozygous genotype, referred as recipient-derived marker sequences, by screening all listed markers using each of the recited primer pairs;

(ii) identification of the said one or more marker sequences from the transplant donor in the recipient and having heterozygous genotype, referred as donor-derived marker sequences by analysing the circulating cell free nucleic acids from the transplant recipient using each of the primer pairs by digital droplet polymerase chain reaction (DDPCR);

(iii) arriving at a ratio of the donor-derived marker sequences to the recipient-derived marker sequences expressed in terms of percent;

(iv) assessment of the organ status of the transplant recipients on comparison of the calculated percent obtained in step (iii) with the cut off value;

wherein the markers are rs2493132, rs6667487, rs553921764, rs4233335, rs10900556, rs1449265, rs7603052, rs1317808, rs2229813, rs4851521, rs7653603, rs6791557, rs7652776, rs9131, rs352007, rs1818782, rs4701997, rs251022, rs714459, rs1801020, rs2842949, rs657941, rs805294, rs2523860, rs2766535, rs1554497, rs35024671, rs7794745, rs15775, rs2002792, rs2575694, rs756627, rs1800392, rs11794980, rs10738924, rs1197943, rs4405241, rs2704522, rs1512705, rs10734083, rs1073525, rs668393, rs1522662, rs481235, rs2277312, rs2043055, rs10841697, rs657197, rs9554250, rs7328030, rs1626923, rs978511, rs741761, rs10162971, rs12449089, rs7193058, rs11866418, rs4323, rs2159132, rs150384, rs3909244, rs12459052, rs67233828, rs3918251, rs2327088, rs1051266, rs2742630, rs1801198, rs6609533, rs2298065, and SI.No.71,

wherein each of the markers is identified by forward and reverse primers according to Table-1; wherein the identified markers ranged between 2 and 9 with a minimum of 3 markers per patient, wherein average of the markers measured as absolute copy numbers (copies/ μ l), is measured and expressed as percentage of donor-derived ccfDNA markers to the recipient-derived markers.

2. The method according to claim 1, wherein the cut off value for monitoring the status of the transplanted organ of the transplant recipient varies with the transplant type and is in the range of 0.1 % to 15%.

3. The method according to claim 1, wherein the biological sample is selected from whole blood, plasma, serum, or urine.
4. The method according to claim 1, wherein the transplant is selected from an organ transplant or a skin / tissue transplant.
5. The method according to claim 4, wherein the organ transplant is selected from one of kidney transplant, heart transplant, liver transplant, pancreas transplant, lungs transplant, intestine transplant, bone marrow or thymus transplant or a combination of more than one organ transplant.
6. The method according to claim 1, wherein the monitoring of the transplant organ status of the transplant recipients is performed for a plurality of times until the rejection of the organ occurs.
7. The method according to claim 1, wherein the frequency of monitoring the transplant organ status of the transplant recipients is a function of time determined based on the transplanted organ and the ratio of the donor-derived marker sequences to the recipient-derived marker sequences expressed in terms of percent over time.