

## CLAIMS

1. A process for determining prognosis for prostate cancer in a human individual comprising detecting in vitro the presence or absence of all 6 of chromosome interactions (a) to (f) shown below in a sample from the individual to determine whether the individual has aggressive prostate cancer or indolent prostate cancer;

wherein the presence or absence of the chromosome interactions is detected by a method comprising the steps of:

(i) cross-linking of chromosome regions of the individual which have come together in a chromosome interaction;

(ii) subjecting the cross-linked regions to cleavage;

(iii) ligating the cross-linked cleaved DNA ends to form ligated nucleic acids; and

(iv) detecting the presence or absence of a ligated nucleic acid corresponding to each chromosome interaction;

wherein the chromosome interactions are as follows:

(a) the chromosome interaction formed on chromosome X in the MIR98 gene between the region of position numbers 53608013 to 53608044 and the region of position numbers 53628991 to 53629022 which relates to aggressive prostate cancer, and

(b) the chromosome interaction formed on chromosome 9 in the DAPK1 gene between the region of position numbers 90073586 to 90073617 and the region of position numbers 90140806 to 90140837 which relates to aggressive prostate cancer, and

(c) the chromosome interaction formed on chromosome 1 in the HSD3B2 gene between the region of position numbers 119912462 to 119912493 and the region of position numbers 119959754 to 119959785 which relates to indolent prostate cancer, and

(d) the chromosome interaction formed on chromosome 21 in the ERG gene between the region of position numbers 39895678 to 39895709 and the region of position numbers 39991874 to 39991905 which relates to indolent prostate cancer, and

(e) the chromosome interaction formed on chromosome 4 in the SRD5A3 gene between the region of position numbers 56188038 to 56188069 and the region of position numbers 56245283 to 56245314 which relates to aggressive prostate cancer, and

(f) the chromosome interaction formed on chromosome 11 in the MMP1 gene between the region of position numbers 102661704 to 102661735 and the region of position numbers 102667612 to 102667643 which relates to the presence of prostate cancer;

wherein:

- the individual will be identified as having aggressive prostate cancer if chromosome interactions (a), (b), (e) and (f) are found to be present and chromosome interactions (c) and (d) are found to be absent, and

- the individual will be identified as having indolent prostate cancer if chromosome interactions (a), (b) and (e) are found to be absent and chromosome interactions (c), (d) and (f) are found to be present.

2. A process according to claim 1, wherein the detecting of the presence or absence of the chromosome interactions comprises specific detection of the ligated nucleic acid by quantitative PCR (qPCR) which uses primers capable of amplifying the ligated nucleic acid and a probe which binds the ligation site during the PCR reaction, wherein said probe comprises sequence which is complementary to sequence from each of the chromosome regions that have come together in the chromosome interaction.

3. A process according to claim 2 wherein said probe comprises:  
a fluorophore covalently attached to the 5' end of the probe, and/or  
a quencher covalently attached to the 3' end of the probe.

4. A process according to claim 3 wherein:  
said fluorophore is selected from HEX, Texas Red and FAM.

5. A process according to claim 2 wherein  
said probe comprises a nucleic acid sequence of length 10 to 40 nucleotide bases.