**Table S4**

|  |  |
| --- | --- |
|  | **PBRM1** |
|  | **Mutation status** | **Mutation DNA** | **Mutation Exon number** | **Mutation Protein** | **Mutation Origin** |
| KIDN001T | M | c.3710C>G | 23 | p.Ser1237\* | Somatic |
| KIDN006T | WT | NA | 11 | NA | Somatic |
| KIDN009T | M | c.2973del | 19 | p.Lys991Asnfs\*23 | Somatic |
| KIDN011T | WT | NA | NA | NA | NA |
| KIDN012T | M | c.97A>G | 1 | p.Arg33Gly | Somatic |
| KIDN014T | WT | NA | NA | NA | NA |
| KIDN015T | WT | NA | NA | NA | NA |
| KIDN016T | NA | NA | NA | NA | NA |
| KIDN017T | WT | NA | NA | NA | NA |
| KIDN018T | WT | NA | NA | NA | NA |
| KIDN021T | M | c.1240.1249delins17 | 11 | p.Lys414\* | Somatic |
| KIDN024T | NA | NA | NA | NA | NA |
| KIDN025T | WT | c.2040delCAGinsTC | 16A | p.Leu680LeufsX6 | Somatic |
| KIDN026T | NA | NA | NA | NA | NA |
| KIDN027T | WT | NA | NA | NA | NA |
| KIDN028T | M | c.275.280delinsTGA | 3 | p.Ile92.Leu94delinsMetMet | Somatic |
| KIDN029T | M | c.2761C>T | 17 | p.Arg921\* | Somatic |
| KIDN035T | M | c.3640.3641del | 22 | p.Glu1214Serfs\*5 | Somatic |
| KIDN036T | M | c.3698G>T | 23 | p.Cys1233Phe | Somatic |
| KIDN040T | WT | NA | NA | NA | NA |
| KIDN043T | NA | NA | NA | NA | NA |
| KIDN045T | WT | c.975insA | 9 | p.Asn325LysfsX4 | Somatic |
| KIDN048T | WT | NA | NA | NA | NA |
| KIDN050T | WT | NA | NA | NA | NA |
| KIDN056T | M | c.2419del | 16b | p.Ile807Phefs\*18 | Somatic |
| KIDN060T | WT | c.3675delC | 22 | p.Pro1225ProfsX2 | Somatic |
| KIDN062T | M | c.1819-1G>A | 15 | NA | Somatic |
| KIDN065T | WT | NA | NA | NA | NA |
| KIDN066T | M | c.2785G>T | 18 | p.Glu929\* | Somatic |
| KIDN068T | WT | NA | NA | NA | NA |
| KIDN073T | WT | NA | NA | NA | NA |
| KIDN081T | WT | NA | NA | NA | NA |
| KIDN083T | WT | NA | NA | NA | NA |
| KIDN085T | WT | NA | NA | NA | NA |
| KIDN095T | WT | NA | NA | NA | NA |
| KIDN101T | M | c.3095.3096delinsAAA | 19 | p.Leu1032Glnfs\*14 | Somatic |
| KIDN102T | WT | NA | NA | NA | NA |
| KIDN105T | M | c.2587.2597del | 17 | p.Glu863Argfs\*8 | Somatic |
| KIDN106T | WT | NA | NA | NA | NA |
| KIDN107T | WT | NA | NA | NA | NA |
| KIDN109T | WT | NA | NA | NA | NA |
| KIDN113T | WT | NA | NA | NA | NA |
| KIDN135T | M | c.3132del | 20 | p.Phe1044Leufs\*115 | Somatic |
| KIDN156T | WT | NA | NA | NA | NA |
| KIDN159T | WT | NA | NA | NA | NA |
| KIDN160T | WT | NA | NA | NA | NA |
| KIDN162T | M | c.2837del | 18 | p.Thr946Asnfs\*68 | Somatic |
| KIDN163T | M | NA | NA | NA | NA |
| KIDN165T | WT | NA | NA | NA | NA |
| KIDN168T | NA | NA | NA | NA | NA |
| KIDN182T | WT | NA | NA | NA | NA |
| KIDN183T | WT | NA | NA | NA | NA |
| KIDN185T | M | c.2756.2761del | 17 | p.Leu919.Lys920del | Somatic |
| KIDN187T | M | NA | NA | NA | NA |
| KIDN188T | WT | c.213delC | 2 | p.\*71LeufextX34 | Somatic |
| KIDN190T | M | NA | NA | NA | NA |
| KIDN191T | WT | NA | NA | NA | NA |
| KIDN192T | M | c.996-11.996-1delinsAA | 10 | NA | Somatic |
| KIDN200T | WT | NA | NA | NA | NA |
| KIDN201T | WT | NA | NA | NA | NA |
| KIDN203T | M | c.1060G>T | 10 | p.Glu354\* | Somatic |
| KIDN204T | NA | NA | NA | NA | NA |
| KIDN205T | NA | NA | NA | NA | NA |
| KIDN207T | NA | NA | NA | NA | NA |
| KIDN215T | WT | NA | NA | NA | NA |
| KIDN237T | WT | NA | NA | NA | NA |
| KIDN239T | M | c.1409A>G | 12 | p.Tyr470Cys | Germline |
| KIDN244T | M | NA | NA | NA | NA |
| KIDN248T | M | c.290del | 3 | p.Ile97Thrfs\*5 | Somatic |
| KIDN251T | WT | NA | NA | NA | NA |
| KIDN252T | WT | NA | NA | NA | NA |
| KIDN253T | WT | NA | NA | NA | NA |
| KIDN256T | WT | NA | NA | NA | NA |
| KIDN257T | M | c.529-1G>T | 5b | NA | Somatic |
| KIDN258T | WT | NA | NA | NA | NA |
| KIDN259T | M | c.1953.1954delinsG | 16a | p.Ser652Glnfs\*4 | Somatic |
| KIDN260T | WT | NA | NA | NA | NA |
| KIDN261T | WT | NA | NA | NA | NA |
| KIDN262T | M | c.3068dup | 19 | p.Tyr1023\* | Somatic |
| KIDN263T | WT | NA | NA | NA | NA |
| KIDN264T | M | NA | NA | NA | NA |
| KIDN266T | WT | NA | NA | NA | NA |
| KIDN267T | WT | NA | NA | NA | NA |
| KIDN268T | M | c.996-4G>A | 10 | NA | Somatic |
| KIDN269T | WT | NA | NA | NA | NA |
| KIDN270T | WT | NA | NA | NA | NA |
| KIDN272T | WT | c.4015delC | 24 | p.Pro1339LeufsX11 | Somatic |
| KIDN273T | WT | NA | NA | NA | NA |
| KIDN274T | WT | NA | NA | NA | NA |
| KIDN275T | M | NA | NA | NA | NA |
| KIDN276T | WT | NA | NA | NA | NA |
| KIDN277T | WT | NA | NA | NA | NA |
| KIDN278T | WT | NA | NA | NA | NA |
| KIDN280T | WT | NA | NA | NA | NA |
| KIDN281T | WT | c.3591indel | 22 | NA | Somatic |
| KIDN282T | WT | NA | NA | NA | NA |
| KIDN285T | M | c.2642.2643insTA | 17 | p.Lys881Asnfs\*35 | Somatic |
| KIDN287T | M | c.2155C>T | 16a | p.Gln719\* | Somatic |
| KIDN289T | M | c.4387C>T | 27 | p.Gln1463\* | Somatic |
| KIDN290T | WT | NA | NA | NA | NA |
| KIDN292T | WT | NA | NA | NA | NA |
| KIDN294T | WT | NA | NA | NA | NA |
| KIDN296T | WT | NA | NA | NA | NA |
| KIDN297T | M | c.4045dup | 24 | p.Leu1349Profs\*4 | Somatic |
| KIDN299T | WT | NA | NA | NA | NA |
| KIDN300T | WT | NA | NA | NA | NA |
| KIDN301T | WT | NA | NA | NA | NA |
| KIDN304T | WT | NA | NA | NA | NA |
| KIDN306T | WT | NA | NA | NA | NA |
| KIDN307T | WT | NA | NA | NA | NA |
| KIDN310T | WT | NA | NA | NA | NA |
| KIDN311T | WT | NA | NA | NA | NA |
| KIDN321T | WT | NA | NA | NA | NA |
| KIDN326T | NA | NA | NA | NA | NA |
| KIDN328T | NA | NA | NA | NA | NA |
| KIDN332T | NA | NA | NA | NA | NA |
| KIDN333T | NA | NA | NA | NA | NA |
| KIDN335T | NA | NA | NA | NA | NA |
| KIDN337T | WT | NA | NA | NA | NA |
| KIDN339T | WT | NA | NA | NA | NA |
| KIDN340T | NA | NA | NA | NA | NA |

|  |  |
| --- | --- |
|   | **VHL** |
|   | **Mutation status** | **Mutation DNA** | **Mutation Exon number** | **Mutation Protein** | **Mutation Origin** |
| KIDN001T | M | c.233A>G | 1 | p.Asn78Ser | Somatic |
| KIDN006T | M | c.166dup | 1 | p.Ala56Glyfs\*76 | Somatic |
| KIDN009T | WT | NA | NA | NA | NA |
| KIDN011T | M | c.561.567delinsG | 3 | p.Asp187.Leu188del | Somatic |
| KIDN012T | M | c.163G>T | 1 | p.Glu55\* | Somatic |
| KIDN014T | M | c.258del | 1 | p.Val87Tyrfs\*72 | Somatic |
| KIDN015T | WT | NA | NA | NA | NA |
| KIDN016T | NA | NA | NA | NA | NA |
| KIDN017T | WT | NA | NA | NA | NA |
| KIDN018T | WT | NA | NA | NA | NA |
| KIDN021T | M | c.160.172del | 2 | p.Met54Glyfs\*9 | Somatic |
| KIDN024T | NA | NA | NA | NA | NA |
| KIDN025T | WT | c.233A>G | 1 | p.Asn78Ser | Somatic |
| KIDN026T | NA | NA | NA | NA | NA |
| KIDN027T | WT | NA | NA | NA | NA |
| KIDN028T | M | c.482dup | 3 | p.Cys162Metfs\*12 | Somatic |
| KIDN029T | WT | NA | NA | NA | NA |
| KIDN035T | M | c.261.262del | 1 | p.Trp88Alafs\*43 | Somatic |
| KIDN036T | WT | NA | NA | NA | NA |
| KIDN040T | WT | NA | NA | NA | NA |
| KIDN043T | NA | NA | NA | NA | NA |
| KIDN045T | WT | NA | NA | NA | NA |
| KIDN048T | M | c.516del | 3 | p.Glu173Argfs\*29 | Somatic |
| KIDN050T | WT | NA | NA | NA | NA |
| KIDN056T | WT | NA | NA | NA | NA |
| KIDN060T | WT | c.319delGCC | 1 | p.Gly106GlydelArgin frame | Somatic |
| KIDN062T | WT | NA | NA | NA | NA |
| KIDN065T | WT | NA | NA | NA | NA |
| KIDN066T | M | c.554A>G | 3 | p.Tyr185Cys | Germline |
| KIDN068T | WT | NA | NA | NA | NA |
| KIDN073T | WT | NA | NA | NA | NA |
| KIDN081T | WT | NA | NA | NA | NA |
| KIDN083T | WT | NA | NA | NA | NA |
| KIDN085T | M | NA | NA | NA | NA |
| KIDN095T | WT | NA | NA | NA | NA |
| KIDN101T | M | c.525C>A | 3 | p.Tyr175\* | Somatic |
| KIDN102T | WT | NA | NA | NA | NA |
| KIDN105T | WT | c.503.509delGCCTAGT | 3 | p.Ser168ThrfsX32 | Somatic |
| KIDN106T | M | c.341-3T>A | 2 | NA | Somatic |
| KIDN107T | WT | NA | NA | NA | NA |
| KIDN109T | WT | NA | NA | NA | NA |
| KIDN113T | WT | NA | NA | NA | NA |
| KIDN135T | WT | NA | NA | NA | NA |
| KIDN156T | M | c.208G>T | 1 | p.Glu70\* | Somatic |
| KIDN159T | WT | NA | NA | NA | NA |
| KIDN160T | WT | NA | NA | NA | NA |
| KIDN162T | WT | NA | NA | NA | NA |
| KIDN163T | WT | NA | NA | NA | NA |
| KIDN165T | M | c.400G>T | 2 | p.Glu134\* | Somatic |
| KIDN168T | NA | NA | NA | NA | NA |
| KIDN182T | M | c.469.477delinsT | 3 | p.Thr157\* | Somatic |
| KIDN183T | WT | NA | NA | NA | NA |
| KIDN185T | M | c.209.243del | 1 | p.Glu70Alafs\*50 | Somatic |
| KIDN187T | M | c.563T>C | 3 | p.Leu188Pro | Somatic |
| KIDN188T | M | c.184.187del | 1 | p.Val62Cysfs\*4 | Somatic |
| KIDN190T | M | c.183C>G | 2 | NA | Somatic |
| KIDN191T | WT | NA | NA | NA | NA |
| KIDN192T | M | c.477del | 3 | p.Glu160Serfs\*10 | Somatic |
| KIDN200T | WT | NA | NA | NA | NA |
| KIDN201T | M | c.375del | 2 | p.His125Glnfs\*34 | Somatic |
| KIDN203T | M | c.325del | 1 | p.Ile109Serfs\*50 | Somatic |
| KIDN204T | NA | NA | NA | NA | NA |
| KIDN205T | NA | NA | NA | NA | NA |
| KIDN207T | NA | NA | NA | NA | NA |
| KIDN215T | M | c.618dup | 3 | p.Ala207Cysfs\*49 | Somatic |
| KIDN237T | M | c.587.596del | 3 | p.Lys196Serfs\*3 | Somatic |
| KIDN239T | WT | NA | NA | NA | NA |
| KIDN244T | WT | NA | NA | NA | NA |
| KIDN248T | M | c.194C>T | 1 | p.Ser65Leu | Somatic |
| KIDN251T | M | c.285del | 1 | p.Gln96Serfs\*63 | Somatic |
| KIDN252T | WT | NA | NA | NA | NA |
| KIDN253T | M | c.346delC | 2 | p.Leu116PhefsX | Somatic |
| KIDN256T | WT | NA | NA | NA | NA |
| KIDN257T | M | c.561.569del | 3 | p.Leu188.Asp190del | Somatic |
| KIDN258T | WT | NA | NA | NA | NA |
| KIDN259T | WT | NA | NA | NA | NA |
| KIDN260T | M | c.266T>A | 1 | p.Leu89His | Somatic |
| KIDN261T | WT | NA | NA | NA | NA |
| KIDN262T | M | c.221T>G | 1 | p.Val74Gly | Somatic |
| KIDN263T | WT | NA | NA | NA | NA |
| KIDN264T | M | NA | NA | NA | NA |
| KIDN266T | WT | NA | NA | NA | NA |
| KIDN267T | WT | NA | NA | NA | NA |
| KIDN268T | M | c.257.267del | 1 | p.Pro86Glnfs\*42 | Somatic |
| KIDN269T | M | c.501del | 3 | p.Ser168Alafs\*2 | Somatic |
| KIDN270T | WT | NA | NA | NA | NA |
| KIDN272T | WT | NA | NA | NA | NA |
| KIDN273T | M | c.472C>G | 3 | p.Leu158Val | Somatic |
| KIDN274T | M | c.465.466insA | 3 | p.Tyr156Ilefs\*18 | Somatic |
| KIDN275T | WT | NA | NA | NA | NA |
| KIDN276T | WT | NA | NA | NA | NA |
| KIDN277T | WT | NA | NA | NA | NA |
| KIDN278T | WT | NA | NA | NA | NA |
| KIDN280T | WT | NA | NA | NA | NA |
| KIDN281T | M | c.406T>A | 2 | p.Phe136Ile | Somatic |
| KIDN282T | M | c.325del | 1 | p.Ile109Serfs\*50 | Somatic |
| KIDN285T | WT | NA | NA | NA | NA |
| KIDN287T | M | c.430G>T | 2 | p.Gly144\* | Somatic |
| KIDN289T | M | c.369.370insC | 2 | p.Thr124Hisfs\*8 | Somatic |
| KIDN290T | M | NA | NA | NA | NA |
| KIDN292T | M | c.227.321del | 1 | p.Phe76Serfs\*24 | Somatic |
| KIDN294T | WT | NA | NA | NA | NA |
| KIDN296T | M | c.641.\*9del | 3 | NA | Somatic |
| KIDN297T | M | c.233A>T | 1 | p.Asn78Ile | Somatic |
| KIDN299T | WT | NA | NA | NA | NA |
| KIDN300T | WT | NA | NA | NA | NA |
| KIDN301T | M | NA | NA | NA | NA |
| KIDN304T | WT | NA | NA | NA | NA |
| KIDN306T | WT | NA | NA | NA | NA |
| KIDN307T | M | NA | NA | NA | NA |
| KIDN310T | M | c.221del | 1 | p.Val74Alafs\*85 | Somatic |
| KIDN311T | M | c.240T>A | 1 | p.Ser80Arg | Somatic |
| KIDN321T | WT | NA | NA | NA | NA |
| KIDN326T | NA | NA | NA | NA | NA |
| KIDN328T | NA | NA | NA | NA | NA |
| KIDN332T | NA | NA | NA | NA | NA |
| KIDN333T | NA | NA | NA | NA | NA |
| KIDN335T | NA | NA | NA | NA | NA |
| KIDN337T | WT | NA | NA | NA | NA |
| KIDN339T | WT | NA | NA | NA | NA |
| KIDN340T | NA | NA | NA | NA | NA |

**Table S5**

|  |  |  |
| --- | --- | --- |
| **Predicted group** | **Training set** | **Validation set** |
| **N(PR)** | **N(SD)** | **N(PD)** | **Sensitivity** | **Specificity** | **N(PR)** | **N(SD)** | **N(PD)** | **Sensitivity** | **Specificity** |
| **Clinical data** |
| **PD vs (PR+SD)** | 52 | 46 | 18 | 88.90% | 75.50% | 33 | 27 | 17 | 35.30% | 78.30% |
| **PR vs (PD+SD)** | 52 | 46 | 18 | 80.80% | 67.20% | 33 | 27 | 17 | 81.80% | 34.10% |
| **SNP data** |
| **PD vs (PR+SD)** | 23 | 15 | 8 | 100.00% | 94.70% | 23 | 15 | 8 | 37.50% | 76.30% |
| **PR vs (PD+SD)** | 23 | 15 | 8 | 95.60% | 86.90% | 23 | 15 | 8 | 47.80% | 69.56% |
| **Methylation data** |
| **PD vs (PR+SD)** | 22 | 15 | 8 | 87.50% | 86.50% | 23 | 15 | 8 | 50.00% | 76.30% |
| **PR vs (PD+SD)** | 22 | 15 | 8 | 81.80% | 82.60% | 23 | 15 | 8 | 60.10% | 69.59% |
| **Transcriptome data (RTq)** |
| **PD vs (PR+SD)** | 18 | 18 | 5 | 100.00% | 100.00% | 21 | 17 | 6 | 50.00% | 76.30% |
| **PR vs (PD+SD)** | 18 | 18 | 5 | 94.40% | 82.60% | 21 | 17 | 6 | 38.10% | 73.91% |
| **Transcriptome data (Affymetrix)** |
| **PD vs (PR+SD)** | 9 | 9 | 2 | NA | NA | 10 | 9 | 2 | NA | NA |
| **PR vs (PD+SD)** | 9 | 9 | 2 | 100.00% | 100.00% | 10 | 9 | 2 | 60.00% | 66.70% |

**Table S6**

|  |
| --- |
| **Genes of the classifier ccrcc2 vs ccrcc3 vs ccrcc14** |
| A1CF | LOX |
| ALDOC | NCRNA00262 |
| ANGPTL4 | NOSTRIN |
| ANXA9 | PFKFB2 |
| ATP6V0D2 | PRLR |
| CA9 | PVALB |
| CDH17 | SCGN |
| CDH16 | SLC17A3 |
| CP | SLC17A4 |
| CUBN | SLC22A8 |
| CYP2J2 | SLC5A1 |
| DIO1 | SLC6A13 |
| GLYAT | VEGFA |
| KNG1 |   |
| **Genes of the classifier ccrcc1 vs ccrcc4** |
| CD274 |
| CD38 |
| CXCL13 |
| IGHA1 |
| IGHD |
| NCAM1 |
| PLAU |
| SPOCK1 |