Supplementary Table 2 | *RAS* mutation frequencies in human cancer									
Cancer	**Samples**	**Alterations**	***KRAS***	**Alterations**	***NRAS***	**Alterations**	***HRAS***	**All *RAS***	**Study; Refs**
Pancreatic ductal adenocarcinoma	114	114	100.0	0	0.0	0	0.0	100.0	JHU; 1
Pancreatic ductal adenocarcinoma	99	94	84.5	0	0.0	0	0.0	94.9	ICGC; 2
Pancreatic ductal adenocarcinoma	3	3	100.0	0	0.0	0	0.0	100.0	TGen; 3
Total	216	211	97.7	0	0.0	0	0.0	97.7	
Colorectal adenocarcinoma	11	6	54.5	0	0.0	0	0.0	54.5	JHU; 4
Colorectal adenocarcinoma	11	5	45.5	2	18.2	0	0.0	63.6	Broad; 5
Colorectal adenocarcinoma	72	37	51.4	2	2.8	0	0.0	54.2	Genentech; 6
Colorectal adenocarcinoma	224	94*	42.0	20*	8.9	0	0.0	48.7	TCGA; 7
Total	318	142	44.7	24	7.5	0	0.0	52.2	
Multiple myeloma	67	17	25.4	17	25.4	0	0.0	50.7	CGP; 8
Multiple myeloma	205	45*	22.0	37*	18.0	0	0.0	39.0	Broad;9
Total	272	62	22.8	54	19.9	0	0.0	42.6	
Lung adenocarcinoma	57	13	22,8	1	1.8	0	0.0	24.6	Genentech; 10
Lung adenocarcinoma	163	60	36.8	3	1.8	0	0.0	38.7	TSP; 11
Lung adenocarcinoma	230	75	32.6	1	0.4	1	0.4	33.5	TCGA; in press
Lung adenocarcinoma	183	49	26.8	1	0.5	1	0.5	27.9	Broad; 12
Total	637	197	30.9	6	0.9	2	0.3	32.2	
Skin cutaneous melanoma	278	4	1.4	85	30.1	3	1.1	33.1	TCGA; provisional
Skin cutaneous melanoma	121	0	0.0	31	25.6	1	0.8	26.4	Broad; 13
Skin cutaneous melanoma	91	0	0.0	19	20.9	1	1.1	22.0	Yale; 14
Total	490	4	0.8	135	27.6	5	1.0	29.4	
Uterine corpus endometrioid carcinoma	248	53*	21.4	9*	3.6	1	0.4	24.6	TCGA; 15
Uterine carcinosarcoma	57	7	12.3	1	1.8	0	0.0	14.0	TCGA; provisional
Thyroid carcinoma	401	4	1.0	34	8.5	14	3.5	13.0	TCGA; provisional
Stomach adenocarcinoma	220	25	11.4	2	0.9	0	0.0	12.3	TCGA; provisional
Acute myeloid leukemia	200	8	4.0	15	7.5	0	0.0	11.5	TCGA; 16
Acute myeloid leukemia	55	0	0.0	2	3.6	4	7.3	10.9	ICGC (KR)
Total	255	8	3.1	17	6.7	4	1.6	11.4	
Bladder urothelial carcinoma	99	7	7.1	2	2.0	15	15.2	24.2	BGI; 17
Bladder urothelial carcinoma	130	0	0.0	2	1.5	6	4.6	6.2	TCGA; 18
Bladder urothelial carcinoma	97	4	4.1	0	0.0	0	0.0	4.1	MSKCC; 19
Bladder cancer	15	2	13.3	0	0.0	0	0.0	13.0	20
Bladder urothelial carcinoma	28	0	0.0	1	3.6	0	0.0	3.6	TCGA; provisional
Total	369	13	3.5	5	1.4	21	5.9	10.6	
Cervical adenocarcinoma	24	2	8.3	0	0.0	0	0.0	8.3	Broad;21
Head and neck squamous cell carcinoma	32	0	0.0	0	0.0	3	9.4	9.4	JHU; 22
Head and neck squamous cell carcinoma	74	1	1.4	0	0.0	4	5.4	6.8	Broad; 23
Head and neck squamous cell carcinoma	279	1	0.4	1	0.4	11	3.9	4.7	TCGA; in revision
Total	385	2	0.5	1	0.3	18	4.7	5.5	
Diffuse large B-cell lymphoma	58	3	0.0	0	0.0	0	0.0	5.2	Broad; 24
Gastric carcinoma	100	4	4.0	1	1.0	0	0.0	5.0	25
Esophageal adenocarcinoma	146	6	4.1	0	0.0	1	0.7	4.8	Broad; 26
Chronic lymphocytic leukaemia	160	3	1.9	4	2.5	0	0.0	4.4	Broad; 27

Lung squamous cell carcinoma	63	3	4,8	0	0.0	0	0.0	4.8	Genentech; 10
Lung squamous cell carcinoma	178	2	1.1	0	0.0	5	2.8	3.9	TCGA; 28
Total	226	5	2.2	0	0.0	5	2.2	4.4	
Small cell lung carcinoma	29	1	3.4	0	0.0	0	0.0	3.4	CLCGP; 29
Small cell lung carcinoma	42	0	0.0	0	0.0	1	2.4	2.4	JHU; 30
Total	71	1	1.4	0	0.0	1	1.4	2.8	
Renal papillary cell carcinoma	168	2	1.2	1	0.6	1	0.6	2.4	TCGA; provisional
Adenoid cystic carcinoma	60	0	0.0	0	0.0	1	1.7	1.7	MSKCC; 31
Medulloblastoma & pilocytic astrocytoma	193	2	1.0	1	0.5	0	0.0	1.6	ICGC (DE)
Chromophobe renal cell carcinoma	66	0	0.0	1	1.5	0	0.0	1.5	TCGA; provisional
Hepatocellular carcinoma	231	2	0.9	1	0.4	0	0.0	1.3	AMC; 32
Hepatocellular carcinoma	27	0	0.0	0	0.0	0	0.0	0.0	RIKEN; 33
Hepatocellular carcinoma	88	0	0.0	2	2.3	0	0.0	2.3	34
Total	346	2	0.6	3	0.9	0	0.0	1.4	
Breast invasive carcinoma (TNBC)	65	0	0.0	2	3.1	0	0.0	3.1	BC; 35
Breast invasive carcinoma (79 ER+/21 ER-)	100	1	1.0	0	0.0	1	1.0	2.0	Sanger; 36
Breast cancer (primary, all major subtypes)	103	0	0.0	0	0.0	0	0.0	0.0	Broad; 37
Breast triple negative/lobular cancer	117	4	3.4	3	2.6	3	2.6	7.7	ICGC (UK)
Breast invasive carcinoma	825	3	3.6	0	0.0	0	0.0	3.6	TCGA; 38
Total	1,210	8	0.7	5	0.4	4	0.3	1.4	
Ovarian serous adenocarcinoma	316	2	0.6	2	0.6	0	0.0	1.3	TCGA; 39
Cervical squamous cell carcinoma	79	1	1.3	0	0.0	0	0.0	1.3	Broad; 21
Adrenocortical carcinoma	91	0	0.0	1	1.1	0	0.0	1.1	TCGA; provisional
Prostate adenocarcinoma	61	1	1.6	0	0.0	0	0.0	1.6	Michigan; 40
Prostate adenocarcinoma	103	1	1.0	0	0.0	0	0.0	1.0	MSKCC; 41
Prostate adenocarcinoma	112	0	0.0	0	0.0	1	0.9	0.9	Broad/Cornell; 42
Prostate adenocarcinoma	57	0	0.0	0	0.0	0	0.0	0.0	Broad/Cornell; 43
Prostate adenocarcinoma	261	0	0.0	0	0.0	2	0.8	0.8	TCGA; provisional
Total	594	2	0.3	0	0.0	3	0.5	0.8	
Neuroblastoma	240	0	0.0	2	0.8	0	0.0	0.8	Broad/GSC; 44
Glioblastoma multiforme	291	2	0.7	0	0.0	0	0.0	0.7	TCGA; 45
Brain lower grade glioma	289	1	0.3	1	0.3	0	0.0	0.7	TCGA; provisional
Medulloblastoma	125	0	0.0	1	0.8	0	0.0	0.8	ICGC; 46
Medulloblastoma	37	0	0.0	0	0.0	0	0.0	0.0	PCGP; 47
Medulloblastoma	92	0	0.0	0	0.0	0	0.0	0.0	Broad; 48
Total	254	0	0.0	1	0.8	0	0.0	0.4	
Renal clear cell carcinoma	14	0	0.0	0	0.0	0	0.0	0.0	CGP; 49
Renal clear cell carcinoma	98	0	0.0	0	0.0	0	0.0	0.0	BGI; 50
Renal clear cell carcinoma	424	1	0.2	0	0.0	1	0.2	0.4	TCGA; 51
Total	536	1	0.2	0	0.0	1	0.2	0.4	
Esophageal adenocarcinoma	11	0	0.0	0	0.0	0	0.0	0.0	JHU; 52
Esophageal squamous cell carcinoma	12	0	0.0	0	0.0	0	0.0	0.0	JHU; 52
Esophageal squamous cell carcinoma	158	0	0.0	0	0.0	0	0.0	0.0	53
Esophageal squamous cell carcinoma	139	0	0.0	0	0.0	0	0.0	0.0	54

Total	309	0	0.0	0	0.0	0	0.0	0.0	
Osteosarcoma (paediatric)	20	0	0.0	0	0.0	0	0.0	0.0	55
Ovarian small cell carcinoma	12	0	0.0	0	0.0	0	0.0	0.0	TGen; 56
Ovarian small cell carcinoma	2	0	0.0	0	0.0	0	0.0	0.0	McGill; 57
Ovarian small cell carcinoma	12	0	0.0	0	0.0	0	0.0	0.0	MSKCC; 58
Total	26	0	0.0	0	0.0	0	0.0	0.0	
Rhabdoid tumors	35	0	0.0	0	0.0	0	0.0	0.0	Broad; 59
Sarcoma	207	0	0.0	0	0.0	0	0.0	0.0	MSKCC/Broad; 60
Small intestine neuroendocrine tumors	55	0	0.0	0	0.0	0	0.0	0.0	Broad; 61
T-cell prolymphocytic leukemia	40	0	0.0	0	0.0	0	0.0	0.0	62

AMC, Asan Medical Center; BC; British Columbia; BGI, Beijing Genomics Institute, Broad, http://cancergenome.broadinstitute.org; CGP, Cancer Genomics Project (Tokyo); CLCGP; Clinical Lung Cancer Genome Project; GSC, Genome Sciences Centre (BC Cancer Agency); ICGC, International Cancer Genome Consortium (AU, Australia; CA, Canada; DE, Germany; KR, South Korea; UK, United Kingdom); JHU; Johns Hopkins University; *METABRIC*, Molecular Taxonomy of Breast Cancer International Consortium; MSKCC; Memorial Sloan Kettering Cancer Center; PCGP, Pediatric Cancer Genome Project; TCGA, The Cancer Genome Atlas, https://tcga-data.nci.nih.gov/tcga/; TSP, Tumor Sequencing Project; *Some *KRAS* and *NRAS* mutations were found in the same patients. Data were also compiled from http://www.cbioportal.org/public-portal/

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