

Supplementary Table 1. siRNA library of 200 genes involved in DNA repair

AKT1	CDK6	ERCC6	IRS1	NEIL1	POLM	RECQL	TOP1
AKT2	CETN2	EXO1	KIAA1596	NEIL2	POLN	RECQL4	TOP2A
APEX1	CFDP1	FANCA	LGP2	NEIL3	POLQ	RECQL5	TOP3A
APEX2	CHEK1	FANCB	LIG3	NEK2	POT1	REV1L	TOP3B
ATM	CHEK2	FANCC	LIG4	NTHL1	PP3856	REV3L	TOPBP1
ATR	CHTF18	FANCD2	MAD2L2	NUDT1	PRDX2	RFC1	TP53BP1
BLM	CKN1	FANCE	MAP2K2	PARP1	PRKDC	RNF40	TP73
BRCA1	CLSPN	FANCF	MAPK1	PARP2	PTCH	RPA1	TREX1
BRCA2	CUL4A	FANCG	MDC1	PHB	PTEN	RUVBL2	TREX1
BRIP1	CUL4B	FANCL	MEN1	PIR51	PTTG1	SHPRH	TREX2
C17orf41	DCLRE1A	FBXO18	MGC5178	PLK2	RAD1	SIRT1	UBE2A
C9ORF76	DCLRE1B	FEN1	MGC5528	PLK3	RAD17	SIRT6	UBE2B
CCNA1	DCLRE1C	FLJ10719	MGMT	PMS1	RAD18	SMARCA1	UBE2I
CCNA2	DDB1	FLJ12610	MLH1	PMS2	RAD21	SMARCA2	UBE2N
CCNB1	DDB2	FLJ21816	MMS19L	PNKP	RAD23A	SMARCA3	UBE2V2
CCNB2	DEPC-1	FLJ35220	MNAT1	POLB	RAD23B	SMARCA4	UNG
CCNB3	DNMT1	G22P1	MPG	POLD1	RAD50	SMC5L1	WDHD1
CCND1	DUT	GTF2H2	MRC1	POLE	RAD51C	SMUG1	WRN
CCND2	EGFR	H2AFX	MRE11A	POLE3	RAD51L1	SOD1	XAB2
CCND3	EME1	HUS1	MSH2	POLE4	RAD51L3	STK11	XPC
CCNE1	EME2	IGF1	MSH3	POLG	RAD52	TDG	XRCC1
CCNE2	ERCC1	IGF1R	MSH6	POLH	RAD54B	TDP1	XRCC2
CDC2	ERCC2	IGF2	MUS81	POLI	RAD54L	TERF2IP	XRCC3
CDK2	ERCC4	INCENP	MUTYH	POLK	RAD9A	TIMELESS	XRCC4
CDK4	ERCC5	INSR	NBS1	POLL	RBBP8	TNKS2	XRCC5

Supplementary Table 2. List of those genes which featured in the top 30 Z scores of both the irradiated SQ20B and MRC5 cell line screens.

APEX1	CCNA2	CLSPN	POLE3
APEX2	CDC2	INCENP	XRCC5

Supplementary Table 3. List of genes which featured in the top 30 Z-scores of the irradiated SQ20B screen but not in either the irradiated MRC5 screen or the unirradiated SQ20B screen.

C9ORF76	NEK2	RAD21	REV3L	TP53BP1
LIG4	POLQ	RAD52	TIMELESS	XAB2
MSH2	PRKDC	RAD54L	TOPBP1	

Supplementary Table 4. Percentage of plated cells capable of colony formation following siRNA transfection. Several genes whose knockdown was associated with increased γ H2AX foci independently of IR exposure were associated with widespread cell death.

	Cell line		
siRNA pool	T24	HeLa	PSN1
NT	43.9%	43.5%	23.9%
XAB2	0.2%	0.1%	0.0%
Rad21	4.1%	1.8%	0.2%

Supplementary Table 5. Percentage of plated cells capable of forming colonies following transfection with either NT or POLQ siRNA (standard deviation).

Cell line	Plating efficiency (SD)	
	NT	POLQ
HeLa	39.7% (4.5%)	30.9% (3.7%)
SQ20B	36.0% (1.9%)	34.7% (3.1%)
T24	51.2% (4.0%)	43.6% (5.0%)
POC	5.0% (0.4%)	4.2% (0.4%)
MRC5	5.2% (0.2%)	5.6% (0.8%)