

Table S3. Gene ontology biological processes enriched by synthetic lethal partners of DDR genes

GO id	GO term	Representative GO term	DAISY	MDSL-P-CF	MDSL-P-sh	CGI
GO:0007568	aging	aging			8.089E-04	
GO:0007569	cell aging	aging			3.446E-02	
GO:0008152	metabolic process	metabolic process	3.866E-24	1.630E-02	2.368E-02	
GO:0009987	cellular process	cellular process	2.134E-03		3.817E-03	
GO:0016032	viral process	viral process	2.120E-03		2.081E-03	
GO:0023052	signaling	signaling			3.839E-02	
GO:0032543	mitochondrial translation	mitochondrial translation		4.748E-53		
GO:0043038	amino acid activation	mitochondrial translation		3.195E-02		
GO:0044265	cellular macromolecule catabolic process	mitochondrial translation	5.723E-08			4.246E-02
GO:0044260	cellular macromolecule metabolic process	mitochondrial translation	2.188E-33			
GO:0018205	peptidyl-lysine modification	mitochondrial translation	8.003E-11			
GO:0140053	mitochondrial gene expression	mitochondrial translation		3.182E-53		
GO:0006482	protein demethylation	mitochondrial translation				5.192E-10
GO:0008214	protein dealkylation	mitochondrial translation				5.192E-10
GO:0006351	transcription DNA-templated	mitochondrial translation	2.190E-18			
GO:0006270	DNA replication initiation	mitochondrial translation	7.354E-08			
GO:0006473	protein acetylation	mitochondrial translation	3.320E-06			
GO:0043543	protein acylation	mitochondrial translation	4.356E-05			
GO:0000959	mitochondrial RNA metabolic process	mitochondrial translation		1.402E-06		
GO:0043412	macromolecule modification	mitochondrial translation	2.126E-12			
GO:0009059	macromolecule biosynthetic process	mitochondrial translation	1.425E-24	1.235E-02		
GO:0010467	gene expression	mitochondrial translation	7.543E-25	2.366E-03		
GO:0008213	protein alkylation	mitochondrial translation	1.741E-03			
GO:0006139	nucleobase-containing compound metabolism	mitochondrial translation	1.221E-49		1.859E-06	
GO:0044267	cellular protein metabolic process	mitochondrial translation	1.234E-09	1.166E-02		
GO:0070647	protein modification by small protein	mitochondrial translation	3.404E-08			
GO:0043603	cellular amide metabolic process	mitochondrial translation		4.496E-12		
GO:0043414	macromolecule methylation	mitochondrial translation	2.796E-05			
GO:0090305	nucleic acid phosphodiester bond formation	mitochondrial translation	4.745E-04			
GO:0019538	protein metabolic process	mitochondrial translation	5.896E-05	2.413E-02		
GO:0006260	DNA replication	mitochondrial translation	4.975E-09			
GO:0032446	protein modification by small protein	mitochondrial translation	1.439E-04			
GO:0006310	DNA recombination	mitochondrial translation	5.382E-05			
GO:0006397	mRNA processing	mitochondrial translation	1.120E-13	1.861E-02	1.262E-04	
GO:0044271	cellular nitrogen compound biosynthesis	mitochondrial translation	3.883E-23	1.141E-04		
GO:0018193	peptidyl-amino acid modification	mitochondrial translation	5.678E-06			
GO:0016071	mRNA metabolic process	mitochondrial translation	6.675E-15		6.415E-04	2.006E-02
GO:0031123	RNA 3'-end processing	mitochondrial translation	1.214E-05			
GO:0016070	RNA metabolic process	mitochondrial translation	2.372E-34		2.890E-03	
GO:1901362	organic cyclic compound biosynthesis	mitochondrial translation	3.834E-20			
GO:0019438	aromatic compound biosynthetic process	mitochondrial translation	2.086E-21			
GO:0018130	heterocycle biosynthetic process	mitochondrial translation	1.317E-21			
GO:0031145	anaphase-promoting complex-dependent proteolysis	mitochondrial translation	3.554E-02			
GO:0018022	peptidyl-lysine methylation	mitochondrial translation	4.015E-04			
GO:1901576	organic substance biosynthetic process	mitochondrial translation	1.515E-20	4.411E-04		
GO:0006259	DNA metabolic process	mitochondrial translation	1.484E-25		1.081E-03	
GO:0034645	cellular macromolecule biosynthesis	mitochondrial translation	1.546E-24	1.053E-02		

GO:1901566	organonitrogen compound biosynthesis	mitochondrial translation		3.311E-11		
GO:0008380	RNA splicing	mitochondrial translation	5.421E-12		3.714E-05	
GO:0006396	RNA processing	mitochondrial translation	3.758E-18	4.121E-05	1.283E-06	
GO:1901361	organic cyclic compound catabolic process	mitochondrial translation				1.204E-04
GO:0006468	protein phosphorylation	mitochondrial translation			2.101E-02	
GO:0006796	phosphate-containing compound metabolic process	mitochondrial translation			1.402E-04	
GO:0090304	nucleic acid metabolic process	mitochondrial translation	8.006E-51		4.967E-05	
GO:0032774	RNA biosynthetic process	mitochondrial translation	2.874E-19			
GO:0006399	tRNA metabolic process	mitochondrial translation		6.362E-03		
GO:0034654	nucleobase-containing compound metabolic process	mitochondrial translation	3.670E-21			
GO:0034655	nucleobase-containing compound catabolic process	mitochondrial translation	1.534E-03			1.902E-05
GO:0009057	macromolecule catabolic process	mitochondrial translation	3.597E-07			
GO:0006261	DNA-dependent DNA replication	mitochondrial translation	3.324E-06			
GO:0050896	response to stimulus	response to stimulus			1.495E-03	
GO:0051726	regulation of cell cycle	regulation of cell cycle	4.257E-15		7.381E-03	
GO:0031647	regulation of protein stability	regulation of cell cycle	3.325E-04			
GO:1901796	regulation of signal transduction by MAPK cascade	regulation of cell cycle	9.520E-05			
GO:0051983	regulation of chromosome segregation	regulation of cell cycle	2.337E-07			
GO:0033044	regulation of chromosome organization	regulation of cell cycle	4.754E-10			
GO:0010564	regulation of cell cycle process	regulation of cell cycle	3.996E-15			
GO:0051173	positive regulation of nitrogen compound metabolic process	regulation of cell cycle	1.827E-12	4.640E-03	4.729E-05	
GO:0062125	regulation of mitochondrial gene expression	regulation of cell cycle		3.304E-03		
GO:0051128	regulation of cellular component organization	regulation of cell cycle	1.036E-02			
GO:0048518	positive regulation of biological process	regulation of cell cycle			6.903E-05	
GO:0040029	regulation of gene expression epigenetically	regulation of cell cycle	1.370E-02			
GO:0065008	regulation of biological quality	regulation of cell cycle			3.398E-03	
GO:0043484	regulation of RNA splicing	regulation of cell cycle	1.689E-02			
GO:1903311	regulation of mRNA metabolic process	regulation of cell cycle	2.233E-09			1.775E-03
GO:0051052	regulation of DNA metabolic process	regulation of cell cycle	3.169E-06		4.357E-02	
GO:0031329	regulation of cellular catabolic process	regulation of cell cycle	6.472E-04			
GO:0009894	regulation of catabolic process	regulation of cell cycle	4.165E-05			
GO:0019222	regulation of metabolic process	regulation of cell cycle	2.030E-14			
GO:0006357	regulation of transcription by RNA polymerase II	regulation of cell cycle	3.881E-10			
GO:0034248	regulation of cellular amide metabolism	regulation of cell cycle	1.779E-02			
GO:0045934	negative regulation of nucleobase-containing compound metabolic process	regulation of cell cycle	2.886E-08		4.872E-03	
GO:0010608	posttranscriptional regulation of gene expression	regulation of cell cycle	4.879E-02			
GO:0032268	regulation of cellular protein metabolism	regulation of cell cycle	9.323E-04			
GO:0051246	regulation of protein metabolic process	regulation of cell cycle	3.883E-03			
GO:0070129	regulation of mitochondrial translation	regulation of cell cycle		4.379E-03		
GO:1901216	positive regulation of neuron death	regulation of cell cycle			2.401E-03	
GO:1900182	positive regulation of protein localization	regulation of cell cycle	1.550E-02			
GO:0019219	regulation of nucleobase-containing compound catabolic process	regulation of cell cycle	4.025E-22		2.583E-02	
GO:1902531	regulation of intracellular signal transduction	regulation of cell cycle			1.525E-03	
GO:1902275	regulation of chromatin organization	regulation of cell cycle	8.865E-04			
GO:0050794	regulation of cellular process	regulation of cell cycle			2.642E-03	
GO:0065007	biological regulation	biological regulation			1.362E-02	
GO:0051276	chromosome organization	chromosome organization	5.450E-48			1.211E-02
GO:0006415	translational termination	chromosome organization	6.366E-37			

GO:0006414	translational elongation	chromosome organization	2.852E-33		
GO:0051383	kinetochore organization	chromosome organization	3.781E-03		
GO:0022411	cellular component disassembly	chromosome organization	1.388E-12		
GO:0022613	ribonucleoprotein complex biogenesis	chromosome organization	4.597E-03		9.430E-06
GO:0000723	telomere maintenance	chromosome organization	9.138E-04		
GO:0032200	telomere organization	chromosome organization	1.389E-03		
GO:0006323	DNA packaging	chromosome organization	3.068E-06		
GO:0043933	protein-containing complex subunit	chromosome organization	1.225E-04	9.748E-05	
GO:0000280	nuclear division	chromosome organization	1.424E-15		
GO:0043604	amide biosynthetic process	chromosome organization	1.070E-16		
GO:0048285	organelle fission	chromosome organization	3.316E-15		
GO:0007005	mitochondrion organization	chromosome organization	1.503E-05		
GO:0071824	protein-DNA complex subunit organization	chromosome organization	1.358E-07		
GO:0065004	protein-DNA complex assembly	chromosome organization	1.060E-05		
GO:0033108	mitochondrial respiratory chain complex assembly	chromosome organization	1.878E-03		
GO:0006996	organelle organization	chromosome organization	3.532E-22		2.621E-04
GO:0006325	chromatin organization	chromosome organization	2.150E-26		
GO:0042026	protein refolding	protein refolding			2.938E-07
GO:0051085	chaperone cofactor-dependent protein folding	protein refolding			2.096E-06
GO:0006458	'de novo' protein folding	protein refolding			1.066E-05
GO:0061077	chaperone-mediated protein folding	protein refolding			1.772E-04
GO:0008219	cell death	cell death			2.556E-02
GO:0006913	nucleocytoplasmic transport	nucleocytoplasmic transport	5.524E-11		4.739E-04
GO:0007041	lysosomal transport	nucleocytoplasmic transport			2.489E-04
GO:0031503	protein-containing complex localization	nucleocytoplasmic transport	8.230E-04		
GO:0051028	mRNA transport	nucleocytoplasmic transport	3.252E-10		
GO:0007034	vacuolar transport	nucleocytoplasmic transport			2.990E-07
GO:0033036	macromolecule localization	nucleocytoplasmic transport			1.946E-02
GO:0051641	cellular localization	nucleocytoplasmic transport			4.305E-02
GO:0015931	nucleobase-containing compound metabolism	nucleocytoplasmic transport	8.681E-07		
GO:0006403	RNA localization	nucleocytoplasmic transport	9.775E-11		1.762E-02
GO:0034504	protein localization to nucleus	nucleocytoplasmic transport	2.303E-02		
GO:0071166	ribonucleoprotein complex localization	nucleocytoplasmic transport	7.783E-10		1.397E-02
GO:0034502	protein localization to chromosome	nucleocytoplasmic transport	2.440E-02		
GO:0051169	nuclear transport	nucleocytoplasmic transport	8.077E-11		7.240E-04
GO:0007059	chromosome segregation	chromosome segregation	2.201E-18		
GO:0007017	microtubule-based process	microtubule-based process	2.010E-05		
GO:0022402	cell cycle process	cell cycle process	2.262E-32		
GO:0051304	chromosome separation	cell cycle process	1.157E-05		
GO:0044770	cell cycle phase transition	cell cycle process	1.503E-18		
GO:0007051	spindle organization	cell cycle process	6.443E-15		
GO:0051301	cell division	cell division	9.813E-14		
GO:0007049	cell cycle	cell cycle	3.231E-33		8.364E-04
GO:0006974	cellular response to DNA damage stimulus	cellular response to DNA	1.478E-18		2.438E-02
GO:0072331	signal transduction by p53 class mediator	cellular response to DNA	7.634E-09	3.779E-02	
GO:0010033	response to organic substance	cellular response to DNA damage stimulus			9.704E-03
GO:0031668	cellular response to extracellular stimulus	cellular response to DNA damage stimulus			3.561E-02
GO:0006950	response to stress	cellular response to DNA damage stimulus			8.027E-04

GO:0035556	intracellular signal transduction	cellular response to DNA damage stimulus	3.500E-05	
GO:0009408	response to heat	cellular response to DNA damage stimulus		4.087E-02
GO:0034620	cellular response to unfolded protein	cellular response to DNA damage stimulus		2.720E-02
GO:0042770	signal transduction in response to	cellular response to DNA	1.153E-02	1.883E-02
GO:0000724	double-strand break repair via homologous recombination	cellular response to DNA	1.557E-05	
GO:0000725	recombinational repair	cellular response to DNA	2.144E-05	
GO:0051716	cellular response to stimulus	cellular response to DNA damage stimulus	5.722E-06	
GO:0006302	double-strand break repair	cellular response to DNA	1.214E-06	
GO:0071840	cellular component organization or biogenesis	cellular component organization	1.085E-11	1.412E-02
GO:0007154	cell communication	cell communication		1.244E-02
GO:0070988	demethylation	demethylation		3.861E-07
GO:0032259	methylation	methylation	3.424E-05	
GO:0046034	ATP metabolic process	ATP metabolic process		3.985E-03
GO:0006119	oxidative phosphorylation	oxidative phosphorylation		1.601E-03
GO:0006123	mitochondrial electron transport chain	oxidative phosphorylation		3.019E-03
GO:0022900	electron transport chain	oxidative phosphorylation		2.228E-03
GO:1901360	organic cyclic compound metabolism	organic cyclic compound	1.154E-45	2.764E-06
GO:0006807	nitrogen compound metabolic process	organic cyclic compound	2.302E-35	9.327E-03
GO:0009058	biosynthetic process	organic cyclic compound	5.392E-19	3.398E-04
GO:0043170	macromolecule metabolic process	organic cyclic compound	9.544E-32	
GO:0044237	cellular metabolic process	organic cyclic compound	1.209E-32	9.450E-04
GO:0044238	primary metabolic process	organic cyclic compound	1.394E-29	2.176E-02
GO:0071704	organic substance metabolic process	organic cyclic compound	2.481E-26	
GO:0006091	generation of precursor metabolite	generation of precursor metabolites and energy	4.334E-02	
GO:0046483	heterocycle metabolic process	generation of precursor metabolites and energy	1.025E-50	1.038E-05
GO:0006793	phosphorus metabolic process	generation of precursor metabolites and energy		1.292E-04
GO:0006725	cellular aromatic compound metabolism	generation of precursor metabolites and energy	5.388E-50	4.120E-06
GO:0034641	cellular nitrogen compound metabolism	generation of precursor metabolites and energy	2.593E-44	2.099E-08
GO:1901564	organonitrogen compound metabolism	generation of precursor metabolites and energy	6.698E-04	1.161E-02