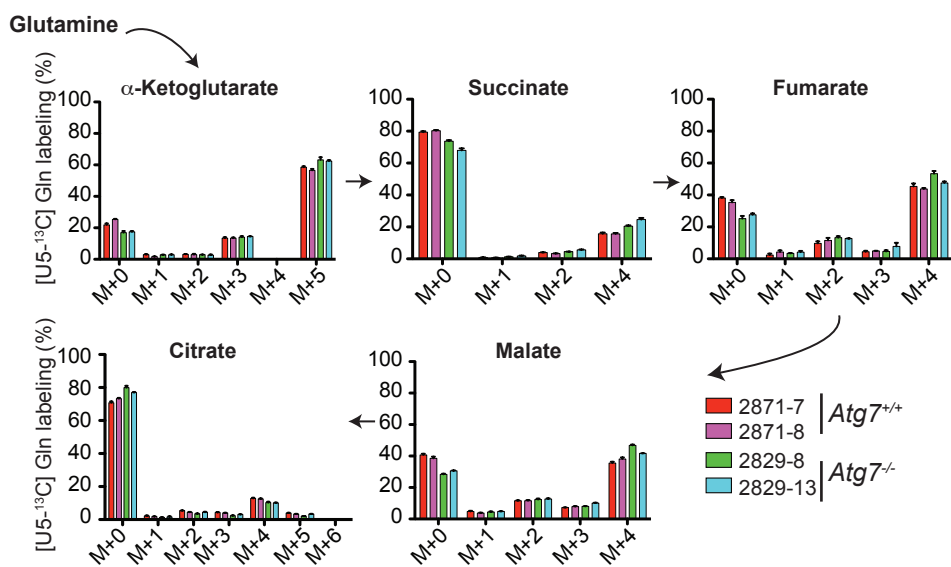
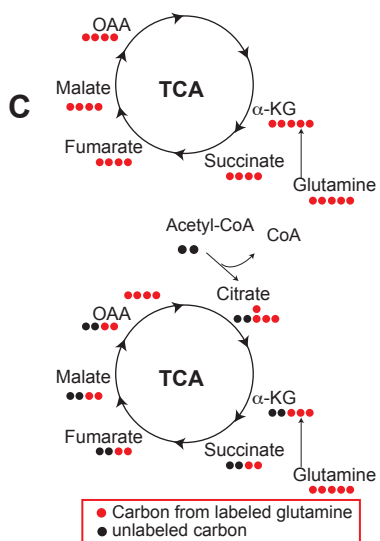
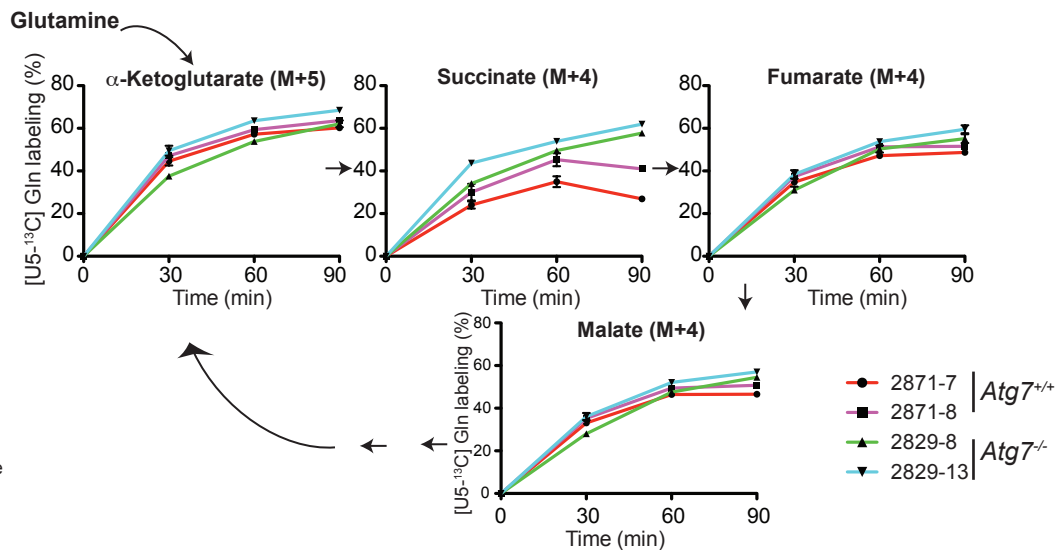
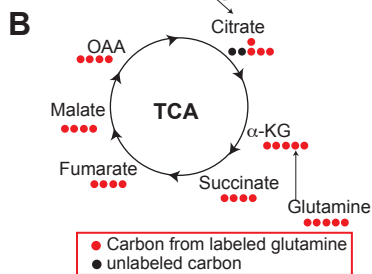
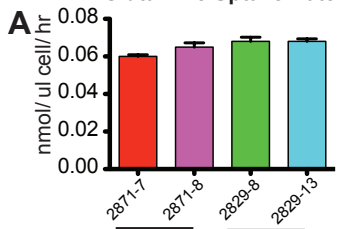
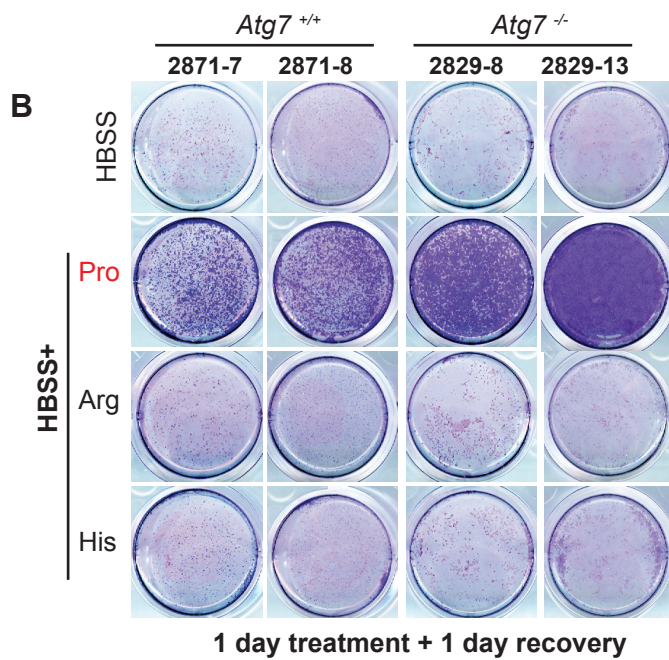
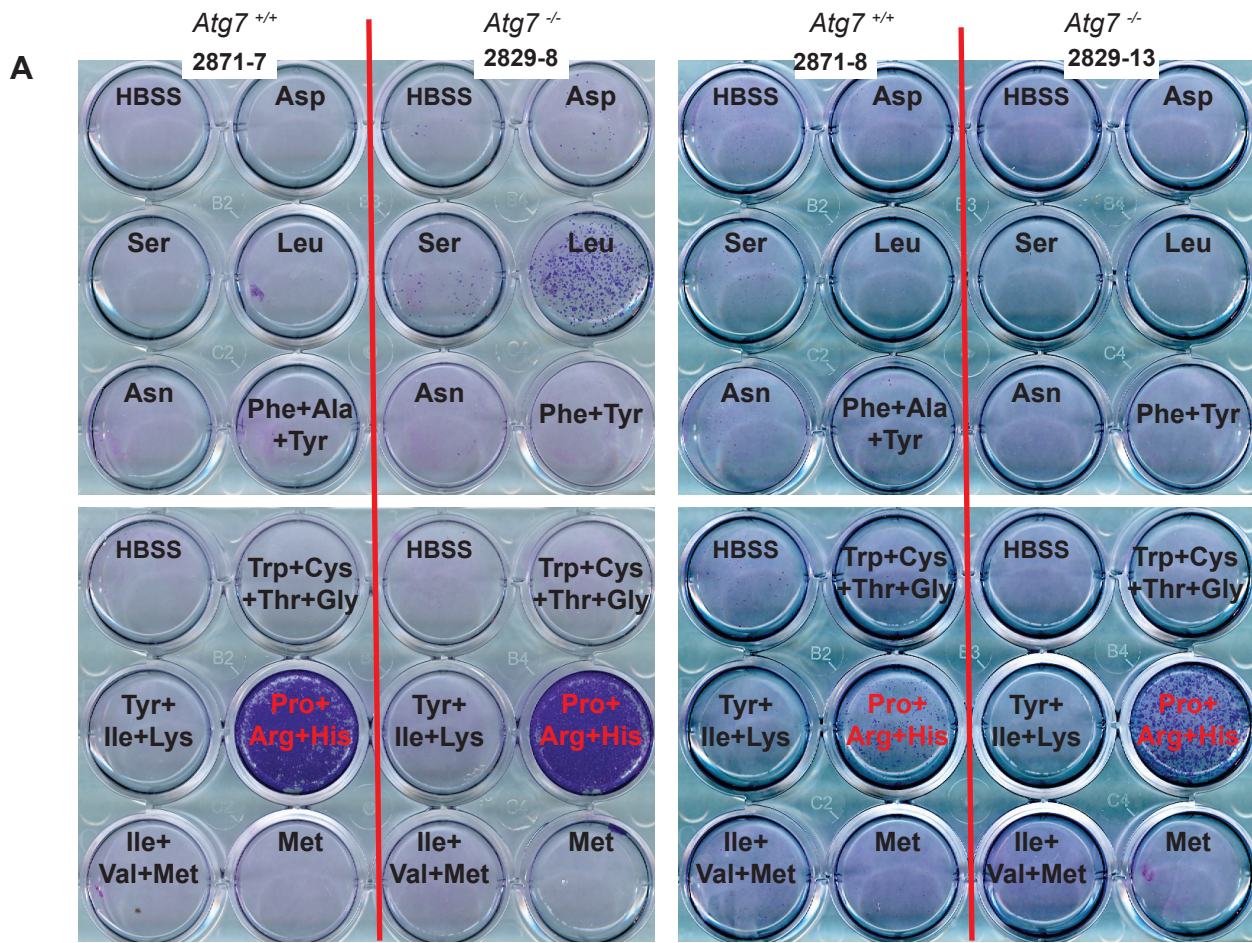
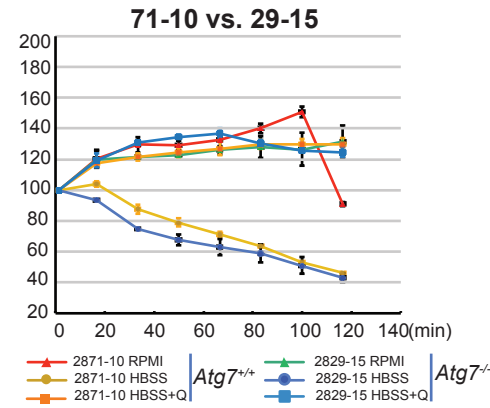
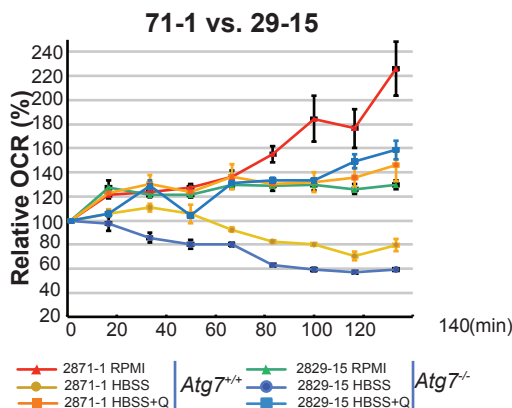
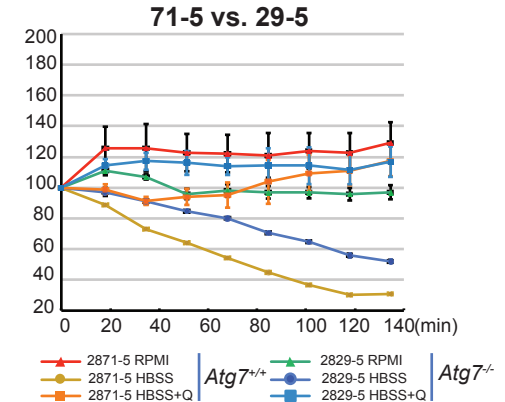
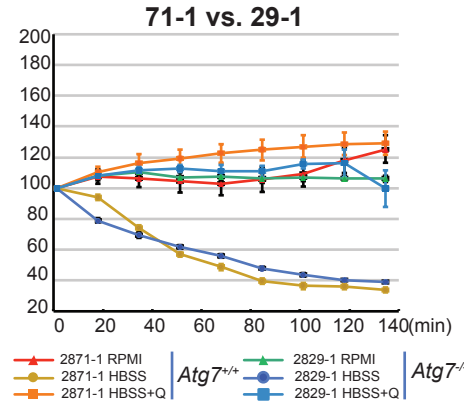
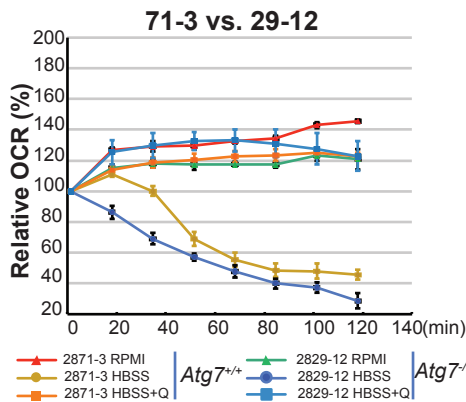
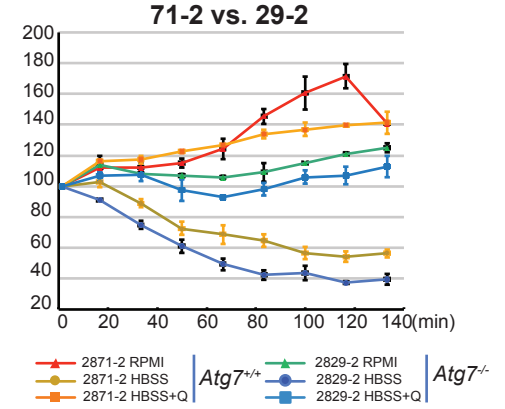
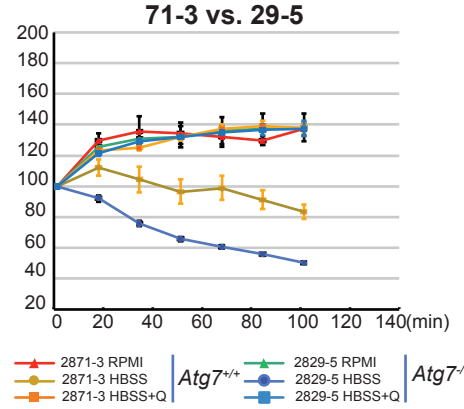
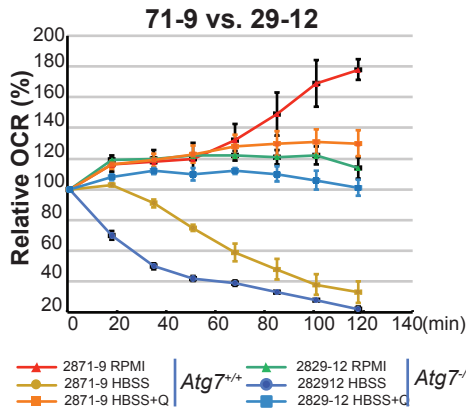
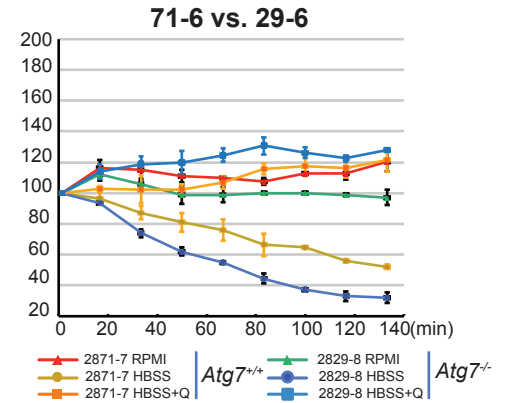
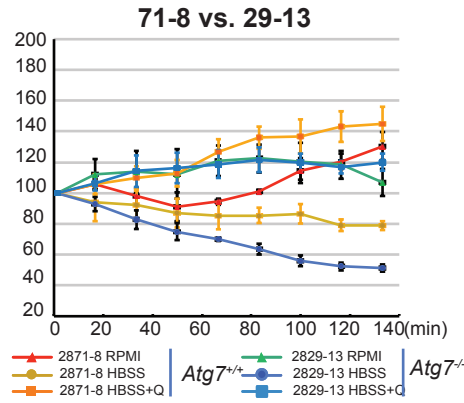
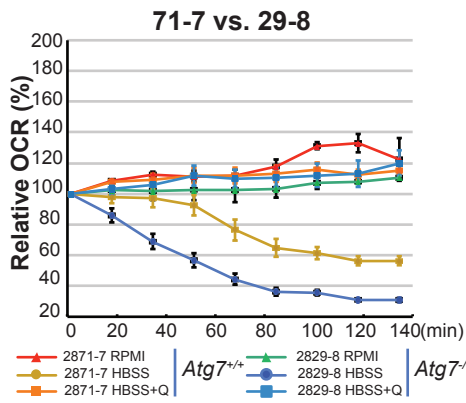
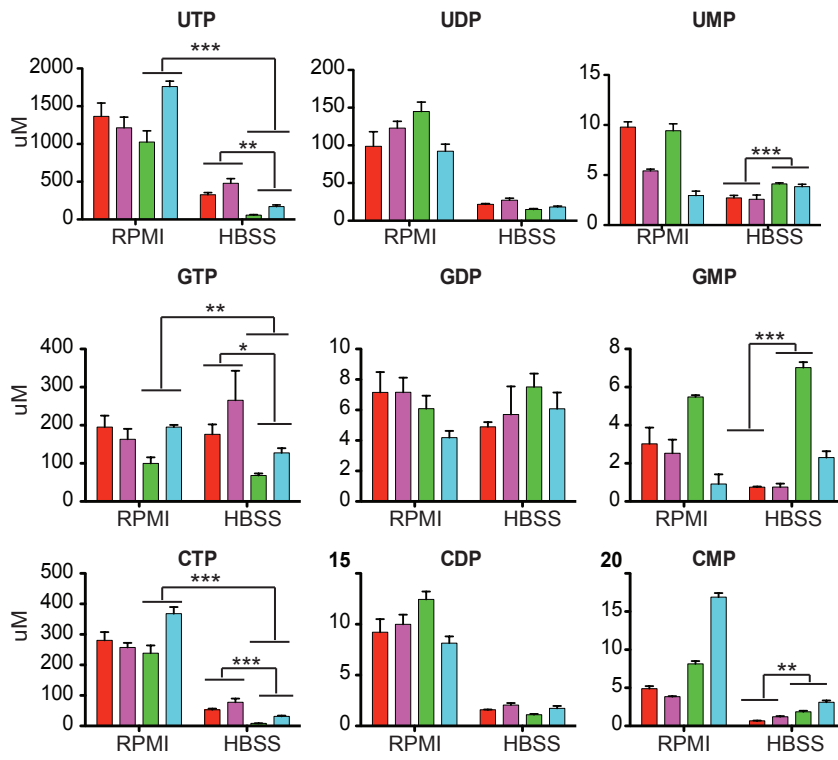


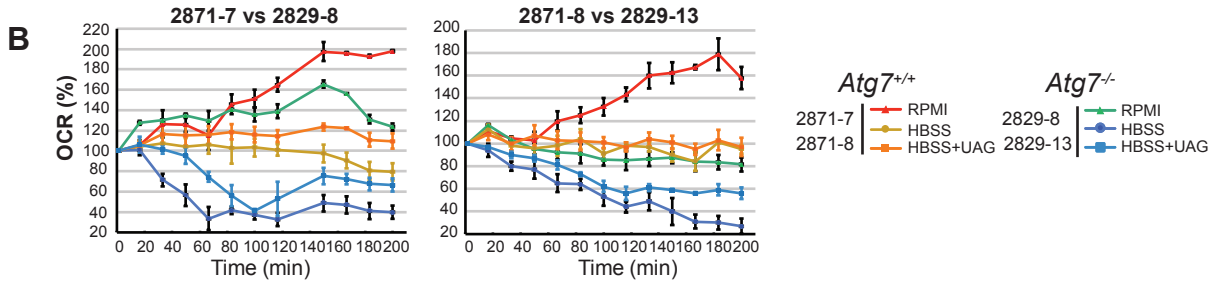
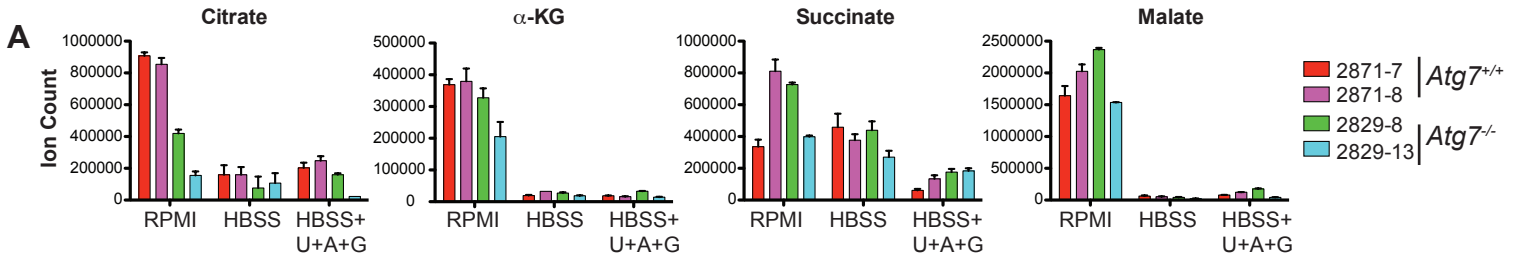
Glutamine Uptake Rate











Supplemental Table 1 Average Coverage across chrM mm10 genome

Tissues	Genotype	Sample ID	R1 read	Total number of Reads (R1+R2)	Properly Paired Alignment	Average coverage*	Alignment percentage (%)	Coverage
Tumor	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	1082	1203260	2406520	2349621	19572.3	97.63563153	22294.89662
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	5285	1248488	2496976	2386054	19666.6	95.55774665	23132.91466
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	5290	1325955	2651910	2581719	21563.1	97.35319072	24568.28088
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	5461	455401	910802	867575	7115.96	95.25396299	8438.008589
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	5586	1165251	2330502	2195926	18165.1	94.22545014	21590.63759
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	6137	2032806	4065612	3696147	30982	90.91243827	37665.34217
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	6139	1564393	3128786	2913369	24426.3	93.11499732	28986.23756
	p53 ^{-/-} ;KrasG12D ^{+/+} ;Atg7 ^{+/+}	6147	1530179	3060358	2781023	23343.4	90.87247309	28352.29511
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	6218	1469185	2938370	2683294	22503.9	91.31913272	27222.15289
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	1343	1472725	2945450	2870880	23930.2	97.46829856	27287.74465
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	5001	1340303	2680606	2584315	21449.5	96.40786449	24834.1313
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	5003	1161315	2322630	2222984	18468.7	95.70977728	21517.70845
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	5275	997045	1994090	1942575	16360.3	97.4166161	18473.99166
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	5541	1362215	2724430	2624585	21961.9	96.33519672	25240.13314
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	6098	1424580	2849160	2668032	22185.3	93.64275787	26395.67826
	p53 ^{-/-} ;KrasG12D ^{+/+} ;ATG7 ^{-/-}	6100	1629356	3258712	3031984	25285.5	93.04240448	30189.92036
	Normal lung	p53F/F;KrasG12D ^{+/+} ;Atg7F/F	2663	1147303	2294606	2236042	18802.4	97.44775356
p53F/F;KrasG12D ^{+/+} ;Atg7F/F		3359	1144763	2289526	2229735	18613.2	97.38849875	21211.02068

Note: *samtools view Coverage using q1 and Q20 , read length = 2X150 bp, Coverage = (Number of reads * Read Length)/Target size.

Supplemental Table 2 MtDNA mutations in Kras-driven tumors

Genotype	Total tumors	Tumors with mtDNA mutation	Total mtDNA mutations	Syn mutataion	Non-Syn mutation	mt-Rnr1 mutation
ATG7+/+	8	1	1	1	0	0
ATG7-/-	8	5	8	6	0	2

P=0.026706 (Bernard's test, one-tail)

Supplemental Table3 mtDNA mutations detected in ATG7+/+ and ATG7-/- lung tumors

Genotype	Mouse ID	#chrM	POS	Genomic Annotation	Variant Effect Predictor	REF	ALT	VAF	Normal Lung Tissue		Lung Tumor Tissue	
									ref/fwd, ref/rev, var/fwd,var/rev	VAF	ref/fwd, ref/rev, var/fwd,var/rev	
ATG7-/-	6098	chrM	231	mt-Rnr1		G	A	0.09%	9779,10098,4,14	3.56%	11391, 11679, 401 450	
ATG7-/-	5541	chrM	231	mt-Rnr1		G	A	0.09%	9779,10098,4,14	13.28%	9654, 10106, 1485, 1500	
ATG7-/-	5275	chrM	9461	mt-Nd3	Syn	C	T	0.46%	7924,8304,14,61	19.79%	5582, 5930, 1386, 1455	
ATG7-/-	6098	chrM	10380	mt-Nd4	Syn	T	C	0.03%	7720,8140,3,1	25.28%	7464, 7861, 2521, 2664	
ATG7-/-	6100	chrM	10380	mt-Nd4	Syn	T	C	0.03%	7720,8140,3,1	19.30%	8943, 9449, 2129, 2270	
ATG7-/-	5541	chrM	10380	mt-Nd4	Syn	T	C	0.03%	7720,8140,3,1	12.69%	8279, 8607, 1200, 1250	
ATG7-/-	6218	chrM	11987	mt-Nd5	Syn	T	C	0.03%	7670,6773,2,2	10.97%	8792, 7942, 1062, 1000	
ATG7-/-	5275	chrM	14424	mt-Cyth	Syn	T	C	0.13%	10582,10702,16,11	7.79%	8663, 8694, 718, 748	
ATG7+/+	5290	chrM	9461	mt-Nd3	Syn	C	T	0.46%	7924,8304,14,61	57.16%	4195, 4420, 5632,5871	

Note: POS:chrM Genome Position; REF:reference; ALT:alternative; VAF: Variant Allele Frequency %, Strand read counts : ref/fwd (Reference Forward),

ref/rev(Reference Reverse), var/fwd(Variant Forward),var/rev(Variant Reverse) , Syn : synonymous variants

read count is based on base Quality filter of 20 and Unique Mapping Quality filter (1)

red color read count represents variants allele

Supplemental Table 4.1 Autophagy mediates substrate recycling: prelabeling metabolites by uniformly 13C- and 15N-labeled amino acids and 13C-labeled glucose

[13C][15N] labeling (%)	R0											
	Atg7+/+						Atg7-/-					
	71-7-1	71-7-2	71-7-3	71-8-1	71-8-2	71-8-3	29-8-1	29-8-2	29-8-3	29-13-1	29-13-2	29-13-3
asparagine	48.809	57.672	47.724	32.253	69.780	63.803	60.463	75.217	46.236	57.962	55.816	59.100
serine	88.607	91.047	93.224	86.912	89.896	92.967	86.948	90.248	89.068	89.119	90.264	87.477
aspartate	96.949	94.943	96.119	95.696	100.000	100.000	98.250	98.627	100.000	98.500	97.591	96.678
G6P	92.245	89.281	93.249	100.000	90.639	100.000		100.000	90.992	100.000	92.269	100.000
a-ketoglutarate	97.142	95.629	96.484	95.604	97.236	97.548	96.525	94.781	93.618	96.542	94.126	96.164
sn-glycerol-3-phosphate	87.449	87.434	89.074	80.983	81.915	82.488	74.005	74.274	73.694	73.297	71.448	70.143
glutamate	99.390	99.727	99.403	99.595	99.624	99.465	99.115	99.331	99.327	99.233	99.333	99.789
CTP	99.049	98.559	98.932	99.326	98.967	98.753	97.518	98.091	97.843	98.967	99.061	98.992
ADP-D-glucose	89.878	89.614	90.003	96.532	96.572	97.057	98.312	97.309	97.050	98.051	98.001	97.042
proline	80.252	80.877	79.230	77.388	78.062	78.338	84.162	84.071	82.401	84.520	84.940	83.732
glutathione	98.251	98.172	98.447	99.872	99.926	99.911	99.946	99.853	99.902	99.977	99.975	99.974
arginine	96.305	93.813	86.182	90.186	100.000	100.000	100.000	100.000	90.408	100.000	93.138	100.000
O8P	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
UDP-D-glucose	99.884	99.868	99.865	99.962	99.959	99.844	99.923	99.895	99.924	99.930	99.944	99.953
dTTP	97.636	97.260	96.975	95.239		98.125	85.287	85.349	88.820	92.139	92.004	93.890
ribose-phosphate	98.824	98.400	100.000	100.000	100.000	100.000	98.437	100.000	100.000	98.796	99.058	100.000
CDP	95.606		97.078	97.056		97.743	96.490	93.175	93.892	98.706	100.000	98.397
cyclic-AMP	93.004	91.087	88.165	96.671	94.878	55.476	98.245	94.114		97.224	96.459	100.000
methionine	90.801	94.457	93.765	94.200	93.563	93.505	94.284	95.443	93.996	92.610	92.122	90.883
histidine	93.388	84.181	91.353	72.658	77.880	79.543	75.098	96.356	92.570	86.903	84.119	92.269
S7P	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
Sedoheptolose bisphosphate	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
tyrosine	90.582	90.109	90.479	89.419	90.535	92.068	91.443	92.222	91.963	89.088	89.306	90.052
valine	88.843	87.797	88.099	84.377	86.671	87.567	89.309	89.207	89.182	85.949	86.719	85.964
threonine	92.677	93.020	94.333	91.671	91.704	92.578	93.459	93.724	93.862	91.696	92.279	91.638
tryptophan	80.076	82.960	80.331	78.664	77.816	80.180	82.186	84.117	83.824	78.230	76.835	81.644
UTP	98.498	98.067	98.500	99.304	99.339	99.304	99.042	99.106	99.088	99.342	99.507	99.423
GTP	87.875	85.180	90.699	95.297	93.959	95.936	98.218	97.150	95.142	99.474	98.997	98.380
AMP	92.061	88.915	85.275	96.474	95.895	91.792	96.088	93.362	94.451	91.560	97.515	98.482
FBP	97.519	97.141	97.671	97.380	97.343	97.631	97.655	97.917	97.557	97.127	96.957	97.337
leucine/isoleucine	93.217	92.439	93.323	89.982	92.721	93.600	92.009	92.471	91.924	89.909	90.727	91.099
UMP	99.408	99.421	99.487	99.516	99.559	99.375	98.945	98.917	98.575	99.008	99.252	98.991
UDP-N-acetyl-glucosamine	98.599	98.405	98.599	99.711	99.836	99.176	99.834	99.880	99.772	99.874	99.882	99.879
GDP	80.265	80.754	78.895	93.363	88.559	95.410	97.487	90.537	90.719	96.706	96.438	94.562
ATP	96.90105	96.77533	97.3932	98.77483	98.48123	98.91333	99.45477	99.24012	98.8877	99.44472	99.51913	99.47092
N-acetyl-glucosamine-1/6-phosphate	95.324	95.360	97.372	100.000	100.000	95.355	100.000	100.000	100.000	100.000	97.670	100.000
coenzyme A	97.615	97.429	98.112	98.187	99.291	98.569	98.776		98.860	99.419	99.615	99.666
alanine	100.000	100.000	100.000	100.000	100.000	100.000			100.000		100.000	100.000
glutathione disulfide	95.853	96.215	97.062	98.091	98.657	99.250	99.235	99.281	99.291	99.407	99.583	99.717
malate	94.445	93.796	94.064	94.364	94.390	94.500	94.291	94.806	94.222	95.628	94.479	94.976
UDP	93.99897	92.02102	93.82823	98.86806	99.11661	99.31967	97.44079	98.43237	97.5805	98.58769	98.70981	99.20607
UDP-D-glucuronate	99.762	99.849	99.807	99.912	99.891	99.916	99.829	99.814		99.880	99.905	99.932
dATP	96.317	94.479	96.178	99.205	95.100	97.336	95.011			84.147		95.252

components.

Supplemental Table 4.2 Autophagy mediates substrate recycling: chasing labeled metabolites with unlabeled RPMI medium

[13C][15N] labeling (%)	R3											
	Atg7+/+					Atg7-/-						
	71-7-1	71-7-2	71-7-3	71-8-1	71-8-2	71-8-3	29-8-1	29-8-2	29-8-3	29-13-1	29-13-2	29-13-3
asparagine	4.947	5.388	6.560	5.399	4.887	4.829	5.266	3.872	4.148	4.411	4.672	4.555
serine	11.205	10.593	12.835	11.994	11.329	12.000	8.420	6.894	6.715	10.851	9.512	9.016
aspartate	13.652	14.476	8.307	11.297	12.391	7.824	10.685	13.250	9.590	11.591	12.048	11.956
G6P	6.002	11.025	9.950	7.834	7.776	8.836	9.226	8.820	7.687	8.865	7.725	7.085
a-ketoglutarate	8.032	9.449	10.082	8.090	8.064	8.199	16.376	11.969	12.587	4.481	4.571	6.316
sn-glycerol-3-phosphate	10.505	11.760	12.562	22.235	22.745	25.465	15.816	15.393	15.522	10.889	9.979	10.894
glutamate	15.741	16.075	16.043	14.570	15.061	15.659	13.292	11.305	8.941	14.396	10.739	13.262
CTP	60.54892	62.55666	59.95469	62.80001	63.18122	59.45763	70.617	71.45954	69.1366	68.48405	70.08772	67.43621
ADP-D-glucose	65.762	63.068	68.579	71.090	68.200	69.415	73.671	72.084	69.117	70.240	71.789	71.456
proline	15.525	15.803	16.317	14.245	13.942	13.855	13.961	13.503	11.253	16.684	16.046	15.352
glutathione	55.022	55.104	54.127	57.954	57.477	56.106	57.492	55.460	55.818	56.352	56.455	55.925
arginine	2.260		3.637	1.171	4.307	3.071	2.146	4.446	6.279	2.616	3.475	4.637
O8P			100.000	100.000	100.000			100.000	100.000		100.000	
UDP-D-glucose	33.757	33.596	31.753	33.587	33.305	33.473	39.879	38.967	37.824	37.529	37.386	36.591
dTTP	36.238	36.081	39.724	32.688	33.212	35.438	28.710	27.857	35.690	35.890	31.838	35.521
ribose-phosphate	7.401	9.735	11.128	7.688	14.605	9.761	2.140	2.272	8.971		11.385	11.385
CDP	43.790	54.953	46.145	54.202	51.091	49.092	65.681	62.642	64.289	50.800	30.195	41.220
cyclic-AMP	58.315	64.962	54.254	62.949	63.744	63.590	59.863	68.853	61.530		70.748	
methionine	9.532	10.549	11.409	11.683	12.203	11.382	9.320	9.337	7.814	11.180	7.999	9.397
histidine	4.348	2.398		3.168	5.228	4.552	1.506	5.303		3.999	1.502	
S7P	17.903	19.640	18.243	18.956	21.792	19.613	21.257	20.154	18.457	17.972	17.134	14.748
Sedoheptoluse bisphosphate	17.903	19.640	18.243	18.956	21.792	19.613	21.257	20.154	18.457	17.972	17.134	14.748
tyrosine	15.345	16.462	15.987	14.525	12.729	14.793	10.702	13.368	11.452	13.890	13.953	12.805
valine	15.508	15.932	18.243	17.274	17.328	13.940	14.647	12.464	15.211	15.238	14.822	17.182
threonine	13.581	13.793	11.711	13.513	14.807	13.072	13.169		12.473	13.144	12.109	11.042
tryptophan	16.359	16.099	16.975	13.374	16.686	16.673	12.345	12.341	9.637	15.932	14.142	17.820
UTP	46.66977	45.63896	39.59458	42.36176	47.94968	44.30624	50.5033	51.38085	50.615	49.40535	51.40839	47.84526
GTP	49.971	52.781	49.934	52.124	50.674	51.131	58.518	56.430	61.795	51.505	48.972	52.273
AMP	63.835	67.289	59.721	69.650	66.853	66.584	69.555	65.595	70.689	70.114	70.401	69.715
FBP	8.779	10.819	20.029	6.357	6.268	6.938	5.863	7.385	5.376	6.672	6.697	6.532
leucine/isoleucine	13.949	13.042	14.489	13.087	12.486	12.362	10.577	10.684	9.713	11.252	11.687	10.584
UMP	36.636	36.158	35.940	37.952	36.928	37.925	46.364	45.731	46.466	41.129	41.236	41.089
UDP-N-acetyl-glucosamine	43.508	44.157	42.741	46.384	44.734	45.902	45.806	44.503	44.943	46.066	45.686	45.236
GDP	46.871	38.205	40.686	46.449	40.785	46.278	52.996	48.600	48.832	43.327	30.816	20.313
ATP	75.16667	76.07054	72.04382	75.97214	76.85102	73.86803	76.78112	76.80337	73.98698	76.92951	77.63019	75.38345
N-acetyl-glucosamine-1/6-phosphate	26.489	27.519	25.346	25.197	23.983	24.709	13.596	15.229	16.680	17.828	20.013	19.830
coenzyme A	96.749	96.814	95.520	96.267	96.798	96.122	97.282	96.823	96.597	97.571	97.640	97.983
alanine	9.465	6.308	7.285	11.774	10.185	8.780	5.891	4.483		4.811	7.583	
glutathione disulfide	81.603	81.064	80.919	82.304	81.168	81.076	80.852	80.473	81.598	81.407	81.609	80.690
malate	10.030	10.394	11.201	10.428	9.344	9.632	10.514	10.052	9.464	9.728	9.630	9.371
UDP	36.06026	37.67878	37.45439	37.22868	39.06379	38.24131	45.74572	46.92362	43.53448	44.10594	35.08668	36.03166
UDP-D-glucuronate	50.395	49.744	49.755	55.451	54.592	55.571	48.057	46.868	46.565	43.830	44.655	45.294
dATP	76.723	78.656	74.031	86.029	61.533	82.446	76.857	86.852	83.379	88.557	90.241	80.568

Note: cells were cultured in uniformly 13C-labeled glucose and glutamine for three days to label endogenous components and followed by three hours culture in unlabeled RPMI to replace labeled with unlabeled metabolites. R3, the time point after cells were cultured in unlabeled RPMI medium for three hours.

Supplemental Table 4.3 Autophagy mediates substrate recycling:the breakdown of intracellular components in starvation

[13C][15N] labeling (%)	H4												WT H4 vs. Null H4		Fold Change (H4/R3)	
	Atg7+/+						Atg7-/-						T test	Atg7+/+	Atg7-/-	
	71-7-1	71-7-2	71-7-3	71-8-1	71-8-2	71-8-3	29-8-1	29-8-2	29-8-3	29-13-1	29-13-2	29-13-3				
asparagine	17.511	15.727	13.253	13.316	19.243	13.029	7.661	4.311	8.997	11.736	5.416	3.829	0.000464564	2.876595223	1.558110916	
serine	61.087	54.084	46.172	82.682	41.492	55.257	8.806	19.300	33.084	39.452	27.536		0.003983893	4.871255849	2.992000014	
aspartate	65.325	81.993	74.847	78.996	72.426	80.368	46.043	41.715	38.255	45.318	36.739		2.44607E-06	6.681023368	3.612334964	
G6P	16.591		14.755	20.806	17.935	19.901	14.684	13.247	13.341	19.352	17.140	17.144	0.17591335	2.099943378	1.920903204	
a-ketoglutarate	68.994	55.262	53.865	60.145	70.779	60.881	22.873		31.899	39.983	50.018	45.618	0.001793717	7.125463258	4.058091417	
sn-glycerol-3-phosphate	48.921	50.279	50.084	53.486	52.897	51.132	36.469		34.857	27.420	31.872		7.22516E-06	2.914349143	2.496126279	
glutamate	86.589	87.468	89.458	86.569	85.401	81.982	47.228	50.482		67.201	59.382	42.177	2.50839E-05	5.555260736	4.445158732	
CTP	74.354	75.473	76.480	79.751	80.730	83.096	78.367	82.150	79.566	78.291	77.874	81.346	0.431269561	1.275125744	1.144699778	
ADP-D-glucose	82.294	81.110	80.094	83.379	84.167	82.304	84.631	85.242	83.784	76.978	78.913	78.068	0.568033379	1.214800415	1.138341077	
proline	33.710	33.275	32.486	37.071	34.857	34.833	25.357	28.056	31.247	31.487	31.523	26.426	0.002159843	2.299475286	2.005733136	
glutathione	58.827	59.262	59.475	61.647	60.009	58.851	58.835	61.641	60.740	58.512	57.158	58.070	0.538698954	1.066354943	1.051711021	
arginine	60.734	62.794	61.825	60.095	62.185	49.936	49.863	47.587	53.225	49.606	54.018	43.062	0.002851567	20.62677243	12.60058441	
O8P	86.344	86.824	83.819	88.163	88.263	90.329	91.065	89.189	88.717	85.539	88.118	87.182	0.410726249	0.872904188	0.88301559	
UDP-D-glucose	72.168	73.214	77.471	76.114	75.713	74.820	70.842	70.226	75.359	70.309	72.216	69.897	0.014234254	2.253461617	1.879466913	
dTTP	64.911	59.906	64.899	68.038	68.278	67.525	42.566	59.337	61.550	59.954	61.642	58.998	0.029702745	1.844385824	1.75977705	
ribose-phosphate	58.621	55.305	56.304	63.002	56.860	59.606	48.672	47.051	47.846	38.433	46.736	47.158	7.52555E-05	5.797571955	6.359458058	
CDP	67.023	71.456	62.359	69.427	72.923	72.085	68.923	72.081	70.342	66.179	67.240	68.660	0.870225587	1.38760552	1.313181935	
cyclic-AMP	70.726	72.669	72.334	74.129	74.087	75.141	74.982	79.532	78.427	73.546	75.177	75.933	0.02110608	1.193770983	1.168857089	
methionine	77.223	77.515	78.147	77.038	81.427	76.534	67.797	71.833	65.036	71.304	71.532	71.793	0.000142694	7.008663898	7.617043866	
histidine	61.376	57.817	58.258	61.406	63.235	57.411	54.833	53.694	51.619	53.791	55.598	56.526	0.000940498	15.21201747	17.65835531	
S7P	74.650	74.406	73.699	77.931	77.320	78.262	72.001	78.074	72.715	70.647	68.801	70.967	0.031076374	3.928363038	3.948219192	
Sedoheptoluse bisphosphate	74.650	74.406	73.699	77.931	77.320	78.262	72.001	78.074	72.715	70.647	68.801	70.967	0.031076374	3.928375893	3.948212463	
tyrosine	67.457	68.096	67.738	68.820	67.880	66.847	63.686	63.932	62.856	62.937	62.466	62.275	1.87826E-07	4.528415647	4.96458067	
valine	74.092	72.720	72.198	71.645	76.820	68.995	68.831	70.539	67.989	67.997	67.460	69.024	0.005229022	4.443574693	4.598277087	
threonine	64.426	61.352	61.659	67.711	64.268	63.648	55.515		56.263	59.872	60.690	62.048	0.010755127	4.759919845	4.753001558	
tryptophan	61.636	63.155	62.797	63.472	63.056	61.645	57.822	61.238	58.682	58.526	58.566	59.026	8.86894E-05	3.907430549	4.303984826	
UTP	57.73806	54.6517	51.30455	57.96327	56.62664	57.25425	61.69862	69.22146	64.26472	58.88195	60.52055	58.16894	0.010380779	1.258956979	1.237742526	
GTP	63.643	66.753	63.877	68.061	68.499	65.761	72.575	74.208	71.947	66.365	68.391	68.690	0.01652489	1.293456808	1.281286537	
AMP	73.725	72.785	72.898	76.363	75.709	74.943	79.146	79.886	80.537	76.446	76.580	77.612	0.001725305	1.13324825	1.130115974	
FBP	15.648	10.314	16.365	18.323	15.577	12.074	11.578	9.680		13.019	13.742		0.142283217	1.491828066	1.869613425	
leucine/isoleucine	77.106	78.731	77.263	76.610	77.170	9.774	70.671	73.372	70.558	69.464	72.196	68.464	0.687428526	4.994692056	6.585206236	
UMP	56.422	57.772	58.743	61.272	64.071	60.778	75.023	75.688	77.519	63.658	64.426	61.953	0.009706733	1.620745902	1.596348764	
UDP-N-acetyl-glucosamine	66.428	67.446	66.678	71.851	71.160	71.120	75.795	78.874	78.604	70.471	70.974	71.232	0.020805057	1.550646464	1.63807555	
GDP	61.501	64.047	63.309	65.311	62.701	62.668	68.866	70.450	68.559	61.790	59.578	65.426	0.201671456	1.463851826	1.611661185	
ATP	79.061	79.135	78.397	81.617	81.449	81.715	82.168	84.751	83.165	81.599	81.515	81.635	0.019820838	1.06978464	1.081565722	
N-acetyl-glucosamine-1/6-phosphate	52.996	50.097	58.455	58.001	59.766	57.830	63.944	65.671	69.161	54.162	65.047	57.344	0.044477486	2.200067209	3.637765278	
coenzyme A	96.232	96.449	95.441	96.526	96.244	96.480	96.403	97.193	97.449	97.135	96.994	97.300	0.00338537	0.998448889	0.997565924	
alanine	7.938	7.637	9.664	11.564	11.926	12.189	2.839	4.036	3.296	6.706	6.390	5.517	0.000519872	1.132383847	0.84279039	
glutathione disulfide	81.698	82.845	79.885	81.303	82.696	81.733	81.550	84.768	84.295	81.086	81.104	82.286	0.326339155	1.004149984	1.017386176	
malate	24.123	21.302	11.499	32.944	25.309	19.148							2.201012042			
UDP	50.08931	49.40426	49.41917	55.73137	52.25996	52.88586	61.06815	63.89015	65.69733	55.93982	51.63957	53.68426	0.020367764	1.372408402	1.399681572	
UDP-D-glucuronate	49.401	53.340	49.018	54.613	53.810	53.120	64.984	69.584	69.259	63.827	64.492	64.913	1.93241E-06	0.993008928	1.442438107	
dATP	78.318	79.208	75.331	79.569	80.626	80.370	73.812	79.041	78.097	76.956	77.215	82.566	0.514224284	1.030481433	0.923454251	

Note: H4, the time point after 4 hour HBSS starvation to degrade intracellular components for recycling. 23 of 43 examined metabolites significantly increased labeling after 4 hour starvation, which is measured by fold change (H4/R3) (fold change>2 was showed in Bold number).

Of these 23 metabolites that were derived substantially from macromolecule degradation, 18 (labeled with red color) of these showed significant differences in labeling between Atg7 WT and deletion cells, with greater labeling in the WT cells in all cases. T-test (FDR<0.05) is used to compare the substrate recycling between Atg7 WT and Atg7 deficient TDCLs in starvation. P value in bold indicates metabolites in Atg7+/+_TDCLs had significantly more [13C], [15] labeling than that in Atg7-/_TDCLs after 4 hour starvation.