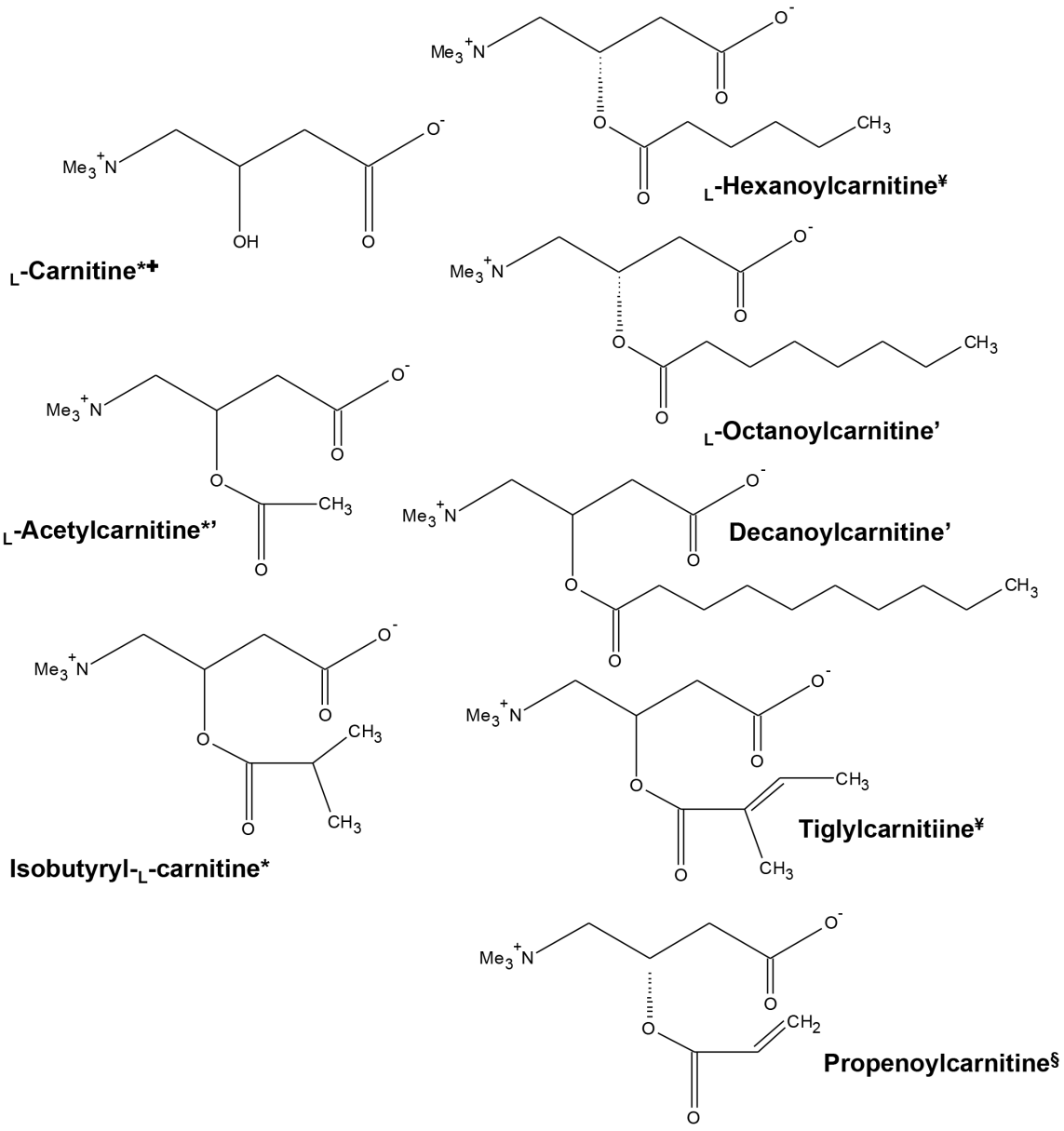
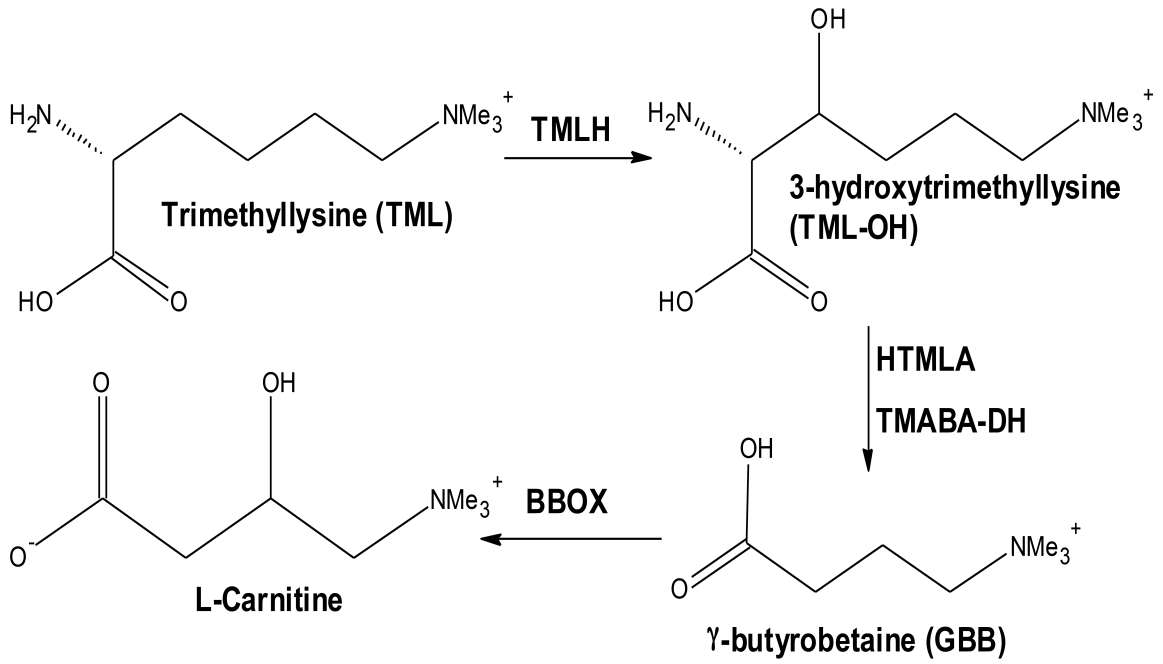
SUPPLEMENTARY FIG. S1

Structure of carnitine and acylcarnitines significantly upregulated after exposure to ionizing radiation



Notes. *Current study; 'human urine, Laiakis *et al.* (2014); ¥mouse urine, Goudarzi *et al.* (*35, 36*); §mouse urine, Laiakis *et al.* (*8*); +rat urine, Mak *et al.* (*17*).

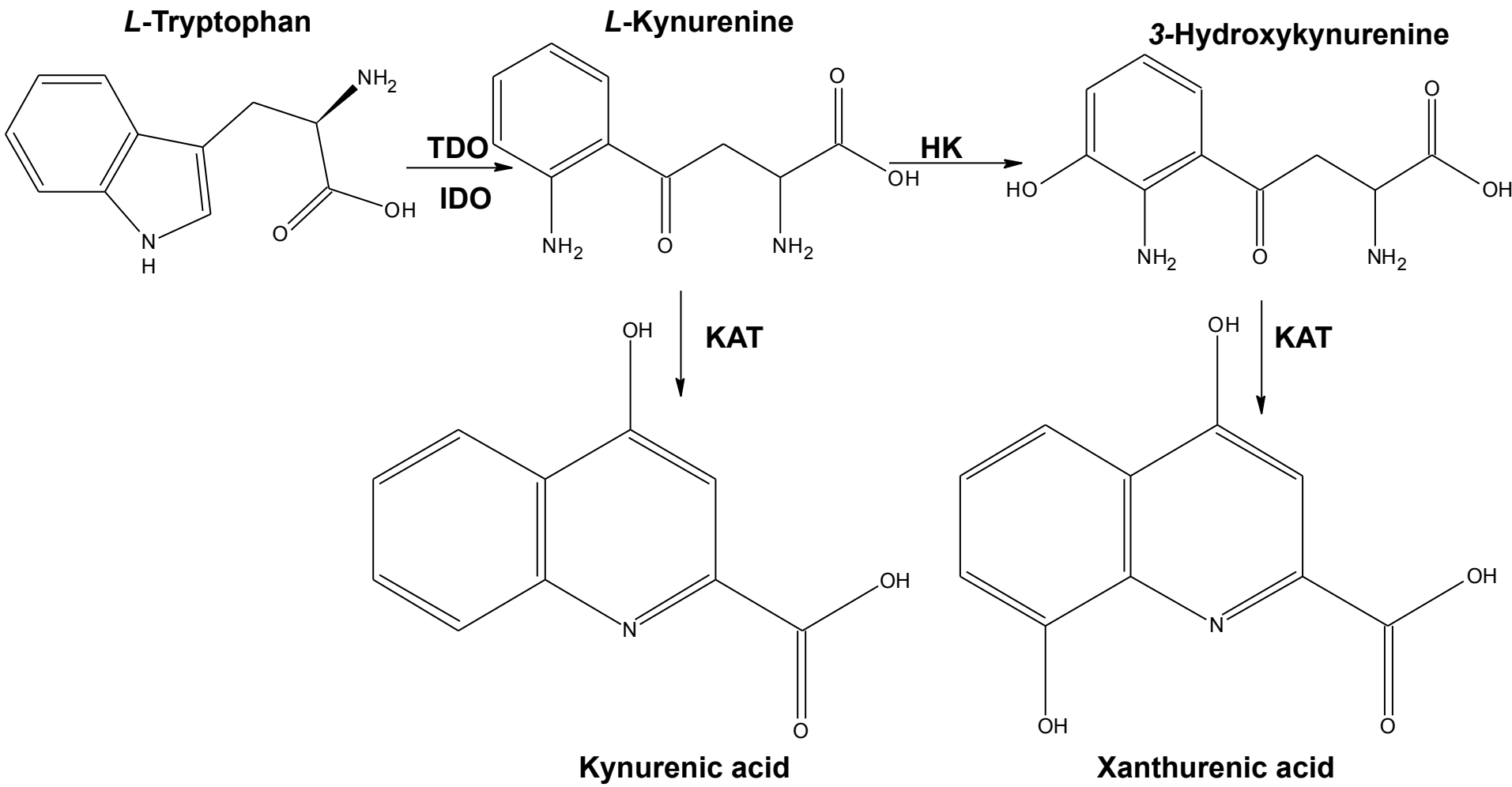
SUPPLEMENTARY FIG. S2
Biosynthesis of L-carnitine from trimethyllysine



Notes. TMLH, N$^{\varepsilon}$-trimethyllysine hydroxylase; HTMLA, 3-hydroxy-N$^{\varepsilon}$-trimethyllysine aldolase; TMABA-DH, 4-N-trimethylaminobutyraldehyde dehydrogenase; BBOX, γ-butyrobetaine dioxygenase.

SUPPLEMENTARY FIG. S3

Kynurenic acid and xanthurenic acid are byproducts of tryptophan metabolism and indicate impaired kidney function



Notes. TDO, tryptophan 2,3-dioxygenase; IDO, indoleamine 2,3-dioxygenase; HK, kynurenine 3-hydroxylase; KAT, kynurenine aminotransferase.

SUPPLEMENTARY TABLE S1
Non-human Primate Hematology Values

MALE	2 Gy		4 Gy		6 Gy		7 Gy		10 Gy	
	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.
WBC (x10^9/L)	8.29±1.51	1.99±0.97	10.82±3.27	1.2±0.37	11.53±2.44	0.84±0.2	10.87±5.58	0.53±0.2	10.52±3.32	0.2±0.06
RBC (x10^12/L)	5.75±0.54	4.83±0.56	5.63±0.38	4.43±0.42	5.99±0.37	4.99±0.37	5.98±0.52	4.82±0.33	5.86±48	5.12±0.41
HGB (g/L)	140±10.6	117±10.5	139±7.9	108±9.1	143±8.3	117±8.6	143±11.2	114±8.7	142±9.8	122±9.6
HCT (L/L)	0.44±0.04	0.36±0.03	0.43±0.03	0.33±0.03	0.45±0.03	0.36±0.03	0.45±0.04	0.35±0.02	0.45±0.03	0.38±0.04
PLT (x10^9/L)	389±56.7	581±113.4	**392±64.5**	**416±56.7**	**365±72.7**	**289±85**	427±78.1	311±64.7	404±46.8	257±86.3
NEUT (x10^9/L)	2.97±1.09	0.93±0.55	5.05±3.5	0.65±0.36	4.71±1.23	0.46±0.21	6.23±4.21	0.28±0.16	5.09±3.01	0.06±0.02
LYMPH (x10^9/L)	4.87±1.37	0.87±0.51	5.18±1.28	0.49±0.27	6.22±2.07	0.33±0.13	4.11±1.55	0.21±0.09	4.89±1.52	0.12±0.04
MONO (x10^9/L)	0.23±0.07	0.12±0.07	0.34±0.14	0.05±0.02	0.3±0.12	0.03±0.02	0.34±0.26	0.02±0.02	0.32±0.08	0.01±0
EOS (x10^9/L)	0.1±0.06	0.03±0.02	0.11±0.11	0±0	0.12±0.21	0.01±0.01	0.06±0.05	0.01±0.01	0.1±0.06	0±0
BASO (x10^9/L)	0.03±0.01	0±0	0.04±0.01	0±0	0.05±0.03	0±0	0.03±0.03	0±0	0.03±0.02	0±0
FEMALE	2 Gy		4 Gy		6 Gy		7 Gy		10 Gy	
	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.	Mean±S.D.
WBC (x10^9/L)	7.36±1.96	2.23±0.99	7.63±2.47	0.83±0.19	8.75±1.9	0.5±0.22	9.26±2.39	0.45±0.22	8.37±2.73	0.19±0.14
RBC (x10^12/L)	5.52±0.25	4.45±0.36	5.47±0.23	4.21±0.37	5.51±0.49	4.49±0.52	5.55±0.5	4.68±0.41	5.23±0.41	4.82±0.75
HGB (g/L)	132±5.4	105±8	133±6	100±7.7	132±8.7	104±8.8	132±7.7	109±8	131±8.8	118±16.8
HCT (L/L)	0.42±0.01	0.33±0.02	0.42±0.02	0.32±0.03	0.42±0.04	0.33±0.04	0.42±0.03	0.34±0.02	0.41±0.03	0.36±0.05
PLT (x10^9/L)	393±56	568±44	**411±42.1**	**442±78.3**	**329±68.8**	**289±74**	383±71.2	311±88.5	416±83.7	290±61
NEUT (x10^9/L)	3.39±1.52	1.43±0.7	4.15±2.38	0.45±0.15	4.65±1.99	0.23±0.1	5.6±1.72	0.21±0.1	4.22±2.86	0.06±0.04
LYMPH (x10^9/L)	3.45±0.85	0.63±0.36	3.12±1.34	0.32±0.13	3.64±1.11	0.23±0.13	3.16±0.81	0.21±0.09	3.71±1.06	0.11±0.09
MONO (x10^9/L)	0.35±0.18	0.13±0.05	0.23±0.09	0.04±0.01	0.28±0.13	0.03±0.02	0.3±0.13	0.03±0.03	0.23±0.07	0.01±0.02
EOS (x10^9/L)	0.09±0.07	0.02±0.02	0.07±0.07	0.04±0.01	0.09±0.05	0±0	0.09±0.05	0.01±0.01	0.12±0.13	0±0
BASO (x10^9/L)	0.02±0.01	0±0	0.02±0.01	0±0	0.02±0.01	0±0	0.02±0.01	0±0	0.03±0.01	0±0

Notes. WBC, white blood cell count; RBC, red blood cell count; HGB, hemoglobin count; HCT, hematocrit level; PLT, platelet count; NEUT, neutrophil count; LYMPH, lymphocyte count; MONO, monocyte count; EOS, eosinophil count; BASO, basophil count. **Bold denotes $P > 0.05$**

SUPPLEMENTARY TABLE S2
Putative Non-human Primate Urinary Biomarkers

Putative biomarkers	Experimental *m/z*	RT min	Adduct	Mass error ppm	*P*-value	Fold change
Dihydrouracil	132.0765	0.59	$M+NH_4$	2.03	<0.001	10.7
Guanosine	284.0995	1.60	M+H	1.93	0.001	7.9
Cortexolone	347.2232	5.43	M+H	3.47	<0.001	33.7
Sebacic acid*	201.1140	4.13	M-H	3.79	0.008	1.9
Corticosterone	347.2229	5.58	M+H	3.47	<0.001	294.7
Deoxyguanosine	268.1049	1.47	M+H	3.29	0.001	1.7
Deoxycorticosterone	331.2282	5.37	M+H	4.35	<0.001	8.3

Notes. *P*-value (from Welch's *t* test) and fold change from control compared to 10.0 Gy (*from 6.0 Gy)

SUPPLEMENTARY TABLE S3
Putative Acylcarnitine and Acylglycine Species of γ Radiation in Non-human Primates

Putative biomarkers	Experimental ion *m/z*	RT min	Mass error ppm	*P*-value	Fold change
Isovalerylcarnitine	246.1697	3.33	1.16	<0.001	38.3
6-Keto-decanoylcarnitine	330.2284	4.48[τ]	2.75	<0.001	7.2
Tiglylcarnitine	244.1541	3.11	1.00	0.001	7.7
Heptanoylcarnitine	274.2017	5.08	1.54	0.005	7.4
9-Dodecanoylcarnitine	314.2331	5.84	1.63	0.008	6.9
Propionoylcarnitine	218.1379	4.99	3.63	0.014	2.1
2-trans,4-cis-Decadienoylcarnitine	312.2173	5.61	1.17	0.657	3.4
Nonanoylcarnitine	302.2334	5.71	2.69	0.789	3.8
L-prolyl-L-glycine	173.0915	1.75	3.33	<0.001	1.2
Indolylacryloylglycine	245.0921	4.96	0.11	<0.001	0.6
Phenylpropionylglycine	208.0971	4.78	1.36	0.001	1.1
Phenylacetylglycine	194.0809	3.80	1.44	0.171	6.0
Isobutyrylglycine	146.0802	1.95	6.74	0.492	2.7
Tiglylglycine	158.0806	2.21	3.68	0.001	0.9
Suberylglycine	232.1172	3.32	3.25	0.060	2.2
2-Furoylglycine	170.0440	2.18	4.16	0.064	4.0
2-Methylbutyrylglycine	160.0958	3.15	6.41	<0.001	0.7

Notes. All $[M+H]^+$ ions; *P*-value (from Welch's *t*-test) and fold change from control compared to 10.0 Gy; [τ] also detected at RT 5.18 and 5.37