

表 II-7. L-プロリン添加飼料を90日間投与したラットの血清生化学的検索結果(雄)

	L-プロリン用量 (%)				
	0 (対照群)	0.625	1.25	2.5	5.0
試験匹数	10	9	10	10	10
TP (g/dL)	6.82±0.09	6.86±0.18	6.89±0.13	6.79±0.19	6.83±0.20
ALB (g/dL)	4.45±0.05	4.47±0.09	4.50±0.06	4.43±0.10	4.50±0.10
A/G	1.88±0.05	1.87±0.05	1.89±0.08	1.88±0.05	1.94±0.06
GLU (mg/dL)	147.9±10.1	137.2±6.7*	137.3±8.1*	132.1±10.3*	137.1±7.1*
T-CHO (mg/dL)	76.8±7.2	79.0±6.2	80.0±8.7	75.7±9.8	81.4±7.4
TG (mg/dL)	88.7±42.2	97.7±21.3	88.7±28.6	80.1±40.5	91.7±31.2
T-BIL (mg/dL)	0.01±0.01	0.01±0.01	0.02±0.01	0.02±0.01	0.02±0.01
BUN (mg/dL)	15.2±0.8	15.5±1.5	15.6±1.6	14.9±1.5	15.1±1.6
CRE (mg/dL)	0.28±0.02	0.27±0.02	0.27±0.02	0.26±0.02	0.25±0.02*
UA (mg/dL)	1.21±0.15	1.18±0.26	1.13±0.16	0.99±0.18*	0.98±0.15*
AST (U/L)	88.9±12.5	88.7±11.5	87.4±11.5	97.1±22.9	93.1±6.4
ALT (U/L)	47.4±7.6	47.1±7.1	43.8±5.5	47.7±11.0	46.0±4.8
GGT (U/L)	0.00±0.67	0.00±0.67	0.00±0.47	0.00±0.47	0.40±0.70
ALP (U/L)	403.4±28.8	379.3±15.0	385.2±25.1	383.3±29.9	391.8±25.3
Na (mmol/L)	142.1±1.3	141.8±2.2	142.8±2.2	143.6±1.9	143.9±1.8
K (mmol/L)	4.75±0.17	4.87±0.58	4.63±0.27	4.57±0.33	4.43±0.16*
Cl (mmol/L)	100.5±1.3	101.1±1.7	101.5±1.4	101.7±1.5	100.9±1.9
Ca (mg/dL)	10.6±0.1	10.7±0.1	10.8±0.2	10.7±0.1	10.8±0.2*

数値は平均値±標準偏差, 対照群との比較で有意差あり(*P<0.05, Dunnett)

表 II-8. L-プロリン添加飼料を90日間投与したラットの血清生化学的検索結果(雌)

	L-プロリン用量 (%)				
	0 (対照群)	0.625	1.25	2.5	5.0
試験匹数	10	10	10	10	10
TP (g/dL)	6.62±0.13	6.71±0.25	6.69±0.18	6.56±0.22	6.60±0.19
ALB (g/dL)	4.37±0.09	4.40±0.14	4.39±0.11	4.37±0.10	4.36±0.12
A/G	1.94±0.06	1.91±0.07	1.91±0.05	2.00±0.09	1.94±0.07
GLU (mg/dL)	109.3±28.4	104.2±14.7	101.6±17.1	97.3±14.6	97.3±13.6
T-CHO (mg/dL)	72.6±8.3	73.5±6.3	73.1±6.4	73.0±3.4	69.7±8.3
TG (mg/dL)	18.3±7.4	21.7±9.6	15.9±4.1	13.6±2.7	12.8±2.0
T-BIL (mg/dL)	0.02±0.00	0.01±0.01	0.02±0.01	0.01±0.01	0.01±0.00
BUN (mg/dL)	19.2±1.0	17.0±1.1*	17.3±1.3*	18.8±1.4	17.3±1.2*
CRE (mg/dL)	0.31±0.03	0.29±0.03	0.29±0.02	0.29±0.03	0.28±0.02*
UA (mg/dL)	1.47±0.41	1.12±0.17*	1.16±0.13	1.15±0.18	1.04±0.10*
AST (U/L)	80.0±3.1	77.5±5.5	77.0±2.9	81.0±8.8	85.2±22.3
ALT (U/L)	33.4±2.7	32.9±4.4	31.7±2.8	32.6±3.8	34.2±2.8
GGT (U/L)	0.80±0.42	0.50±0.53	0.70±0.48	0.70±0.48	0.60±0.70
ALP (U/L)	307.0±25.5	318.3±39.9	297.4±35.8	286.4±21.1	297.6±22.9
Na (mmol/L)	145.2±1.3	145.8±2.0	145.0±1.3	146.2±0.5	148.1±1.6*
K (mmol/L)	4.30±0.28	4.50±0.34	4.16±0.16	4.11±0.15	4.19±0.30
Cl (mmol/L)	107.7±1.4	106.9±2.6	108.0±1.8	108.4±1.2	108.8±1.9
Ca (mg/dL)	10.5±0.2	10.5±0.3	10.5±0.2	10.4±0.3	10.6±0.2

数値は平均値±標準偏差, 対照群との比較で有意差あり(*P<0.05, Dunnett)

表 II-9. L-プロリン添加飼料を90日間投与したF344ラットの尿性状(雄)

		L-プロリン用量 (%)				
		0 (対照群)	0.625	1.25	2.5	5.0
試験匹数		10	10	10	10	10
ウロビリノーゲン	—	10	10	10	10	10
ビリルビン	—	10	10	10	10	10
ケトン体	—	8	6	5	7	8
	±	2	4	5	3	2
	陽性総数	2	4	5	3	2
糖	—	10	10	10	10	10
タンパク	—	0	0	0	0	0
	±	3	3	5	5	6
	+	7	7	5	5	3
	++	0	0	0	0	1
	陽性総数	10	10	10	10	10
pH	6.0	6	6	5	7	4
	6.5	3	3	2	3	4
	7.0	1	1	3	0	2
亜硝酸塩	—	10	10	10	10	10

数値はラット匹数

表 II-10. L-プロリン添加飼料を90日間投与したF344ラットの尿性状(雌)

		L-プロリン用量 (%)				
		0 (対照群)	0.625	1.25	2.5	5.0
試験匹数		10	10	10	10	9
ウロビリノーゲン	—	10	10	10	10	9
ビリルビン	—	10	10	10	10	9
ケトン体	—	10	10	10	10	9
糖	—	10	10	10	10	9
タンパク	—	9	8	8	6	6
	±	1	2	2	3	3
	30 mg/dL	0	0	0	1	0
	陽性総数	1	2	2	4	3
pH	6.0	8	7	5	7	7
	6.5	2	2	5	2	2
	7.0	0	1	0	1	0
亜硝酸塩	—	10	10	10	10	9

数値はラット匹数

表 II-11. L-プロリン添加飼料を90日間投与したF344ラットの最終体重及び器官重量(雄)

	L-プロリン用量 (%)				
	0 (対照群)	0.625	1.25	2.5	5.0
試験匹数	10	10	10	10	10
最終体重 (g)	304.9±13.4	308.1±13.5	307.3±12.6	296.2±22.8	296.6±16.9
絶対重量 (mg)					
脳	2007.7±26.2	2000.2±55.1	2009.3±25.9	1981.2±43.0	2001.0±20.5
甲状腺/上皮小体	14.3±1.2	14.9±1.9	14.5±1.6	14.1±1.61.2	14.4±1.3
心臓	848.8±41.4	856.4±46.4	865.4±52.9	841.1±55.3	856.4±47.5
脾臓	594.9±38.1	608.1±21.5	618.6±27.9	610.7±50.4	625.0±43.0
肝臓	6767.2±382.1	6954.3±595.1	6973.8±327.0	6551.9±805.0	6898.4±676.2
副腎	38.5±1.8	37.8±4.3	39.0±2.0	37.8±3.6	40.0±2.7
腎臓	1654.6±71.0	1715.2±86.1	1683.5±72.9	1648.0±108.7	1713.5±96.2
精巣	3044.2±93.5	3024.9±109.0	3051.5±111.3	2932.7±250.8	3002.0±118.0
相対重量 (mg/100g 体重)					
脳	659.6±31.2	649.9±24.6	654.8±27.8	671.6±41.5	676.3±34.2
甲状腺/上皮小体	4.7±0.3	4.8±0.5	4.7±0.5	4.8±0.4	4.8±0.3
心臓	278.6±12.1	278.0±10.8	281.5±10.7	284.3±9.6	288.9±9.5
脾臓	195.1±9.6	197.5±5.9	201.4±6.6	206.4±11.7*	210.6±6.3*
肝臓	2218.9±59.5	2254.1±109.4	2269.8±70.1	2206.6±132.5	2321.5±110.2
副腎	12.6±0.7	12.3±1.1	12.7±0.7	12.8±1.1	13.5±1.3
腎臓	543.2±26.1	556.6±11.8	548.1±18.7	557.0±16.0	578.1±22.5*
精巣	999.5±38.4	982.6±39.2	994.1±45.0	991.9±78.5	1014.3±57.3

数値は平均値±標準偏差, 対照群との比較で有意差あり(*P<0.05, Dunnett)

甲状腺/上皮小体は固定後の重量

表 II-12. L-プロリン添加飼料を90日間投与したF344ラットの最終体重及び器官重量(雌)

	L-プロリン用量 (%)				
	0 (対照群)	0.625	1.25	2.5	5.0
試験匹数	10	10	10	10	10
最終体重 (g)	153.6±7.8	166.5±10.0*	164.2±10.7	157.1±11.4	156.9±12.8
絶対重量 (mg)					
脳	1835.0±43.8	1858.5±30.3	1847.0±44.3	1836.6±25.8	1853.2±23.8
甲状腺/上皮小体	9.4±1.1	11.2±2.0	10.1±1.3	9.2±0.9	10.5±0.6*
心臓	494.9±33.0	526.6±34.6	528.9±34.7	507.5±34.2	527.1±29.9
脾臓	332.6±19.9	363.7±27.5*	360.8±25.9	349.4±27.1	352.0±24.2
肝臓	3191.7±220.2	3419.5±240.9*	3390.7±165.1	3197.4±198.1	3246.4±164.4
副腎	40.3±3.0	42.0±3.1	40.9±3.2	40.8±2.3	40.5±1.9
腎臓	923.5±46.1	982.6±62.2*	983.6±40.9*	950.8±38.1	955.0±44.3
卵巣	46.3±4.1	50.8±5.6	50.9±5.5	47.6±4.6	48.3±3.7
子宮	334.7±41.6	413.0±64.6*	384.7±59.6	378.0±62.1	368.2±62.2
相対重量 (mg/100g 体重)					
脳	1197.3±59.1	1119.8±63.6	1128.1±59.7	1174.2±79.7	1187.4±88.9
甲状腺/上皮小体	6.1±0.6	6.7±1.4	6.2±0.7	5.9±0.8	6.7±0.5
心臓	322.4±16.2	316.5±14.2	322.6±19.4	323.6±18.2	337.4±26.5
脾臓	217.0±15.7	218.4±6.8	219.8±9.1	222.7±13.0	224.7±11.4
肝臓	2079.9±131.6	2054.1±74.2	2068.5±88.3	2037.9±71.8	2074.5±93.4
副腎	26.3±2.4	25.3±1.5	25.0±1.7	26.0±1.4	25.9±2.2
腎臓	602.4±37.0	590.5±20.8	600.2±27.1	606.8±27.4	610.6±33.3
卵巣	30.1±2.0	30.5±2.6	31.1±3.4	30.3±2.2	30.9±3.0
子宮	218.5±30.7	248.2±36.4	234.8±36.8	240.7±35.8	234.5±32.2

数値は平均値±標準偏差, 対照群との比較で有意差あり(*P<0.05, Dunnett)

甲状腺/上皮小体は固定後の重量

表 II-13. L-プロリン添加飼料を90日間投与したF344ラットの組織学的観察結果

	L-プロリン用量 (%)	雄					雌				
		0	0.625	1.25	2.5	5.0	0	0.625	1.25	2.5	5.0
試験匹数		10	10	10	10	10	10	10	10	10	10
肝臓	肝細胞壊死	0	1	0	1	2	0	0	0	0	0
	微小肉芽	0	0	0	0	0	0	0	0	0	0
	炎症性細胞浸潤	8	9	7	9	7	4	6	6	6	5
	胆管軽度増生	1	1	1	1	0	0	0	0	0	0
腎臓	再生尿細管	10	10	10	10	10	3	0	0	2	1
	虚血性尿細管萎縮	6	5	6	6	3	3	2	4	5	1
	炎症性細胞浸潤	0	1	1	0	0	0	0	0	0	0
	尿細管拡張	3	2	4	0	5	0	0	0	0	1
	石灰沈着	1	3	0	5	2	8	8	6	8	8

数値は所見を示したラット匹数, 対照群との比較で有意差あり(*P<0.05, Fisher の直接確立検定)

研究成果の刊行に関する一覧表

雑誌

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