

シクロヘキセンのラットを用いた
吸入によるがん原性試験報告書

試験番号：0399

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TABLE 1 SURVIVAL ANIMAL NUMBERS AND BODY WEIGHT CHANGES OF MALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Weeks on Study	Control		600ppm			1200ppm			2400ppm		
	Av.Wt.	No.of Surviv.	Av.Wt.	% of cont.	No.of Surviv.	Av.Wt.	% of cont.	No.of Surviv.	Av.Wt.	% of cont.	No.of Surviv.
	<50>		<50>			<50>			<50>		
0	126 (50)	50/50	126 (50)	100	50/50	126 (50)	100	50/50	126 (50)	100	50/50
1	159 (50)	50/50	156 (50)	98	50/50	156 (50)	98	50/50	153 (50)	96	50/50
2	192 (50)	50/50	186 (50)	97	50/50	185 (50)	96	50/50	177 (50)	92	50/50
3	217 (50)	50/50	211 (50)	97	50/50	209 (50)	96	50/50	199 (50)	92	50/50
4	237 (50)	50/50	230 (50)	97	50/50	228 (50)	96	50/50	218 (50)	92	50/50
5	250 (50)	50/50	244 (50)	98	50/50	242 (50)	97	50/50	231 (50)	92	50/50
6	260 (50)	50/50	254 (50)	98	50/50	254 (50)	98	50/50	241 (50)	93	50/50
7	273 (50)	50/50	268 (50)	98	50/50	267 (50)	98	50/50	255 (50)	93	50/50
8	285 (50)	50/50	281 (50)	99	50/50	280 (50)	98	50/50	266 (50)	93	50/50
9	297 (50)	50/50	292 (50)	98	50/50	291 (50)	98	50/50	274 (50)	92	50/50
10	302 (50)	50/50	299 (50)	99	50/50	299 (50)	99	50/50	283 (50)	94	50/50
11	310 (50)	50/50	308 (50)	99	50/50	306 (50)	99	50/50	290 (50)	94	50/50
12	315 (50)	50/50	314 (50)	100	50/50	314 (50)	100	50/50	296 (50)	94	50/50
13	322 (50)	50/50	320 (50)	99	50/50	321 (50)	100	50/50	303 (50)	94	50/50
14	327 (50)	50/50	326 (50)	100	50/50	326 (50)	100	50/50	310 (50)	95	50/50
18	345 (50)	50/50	344 (50)	100	50/50	342 (50)	99	50/50	323 (50)	94	50/50
22	357 (50)	50/50	357 (50)	100	50/50	358 (50)	100	50/50	336 (50)	94	50/50
26	370 (50)	50/50	371 (50)	100	50/50	371 (50)	100	50/50	345 (50)	93	50/50
30	378 (50)	50/50	380 (50)	101	50/50	380 (50)	101	50/50	353 (50)	93	50/50
34	388 (50)	50/50	392 (50)	101	50/50	391 (50)	101	50/50	363 (49)	94	49/50
38	396 (50)	50/50	399 (50)	101	50/50	399 (50)	101	50/50	371 (49)	94	49/50
42	404 (50)	50/50	408 (50)	101	50/50	410 (50)	101	50/50	383 (49)	95	49/50
46	411 (50)	50/50	413 (50)	100	50/50	414 (50)	101	50/50	389 (49)	95	49/50
50	415 (50)	50/50	416 (50)	100	50/50	417 (49)	100	49/50	390 (49)	94	49/50
54	419 (50)	50/50	419 (50)	100	50/50	420 (49)	100	49/50	392 (49)	94	49/50
58	422 (50)	50/50	423 (50)	100	50/50	424 (49)	100	49/50	395 (49)	94	49/50
62	428 (49)	49/50	427 (50)	100	50/50	431 (49)	101	49/50	401 (49)	94	49/50
66	433 (49)	49/50	430 (50)	99	50/50	434 (49)	100	49/50	400 (49)	92	49/50
70	433 (49)	49/50	431 (50)	100	50/50	433 (49)	100	49/50	401 (48)	93	48/50
74	432 (48)	48/50	430 (50)	100	50/50	432 (48)	100	48/50	401 (48)	93	48/50
78	432 (48)	48/50	426 (50)	99	50/50	429 (48)	99	48/50	399 (48)	92	48/50
82	432 (47)	47/50	429 (49)	99	49/50	428 (48)	99	48/50	399 (47)	92	47/50
86	427 (47)	47/50	425 (49)	100	49/50	425 (48)	100	48/50	395 (45)	93	45/50
90	426 (44)	44/50	423 (49)	99	49/50	422 (48)	99	48/50	389 (43)	91	43/50
94	426 (43)	43/50	422 (46)	99	46/50	424 (47)	100	47/50	389 (42)	91	42/50
98	420 (43)	43/50	414 (45)	99	45/50	419 (45)	100	45/50	385 (41)	92	41/50
102	413 (40)	40/50	410 (42)	99	42/50	409 (44)	99	44/50	379 (40)	92	40/50
104	402 (40)	40/50	407 (40)	101	40/50	398 (44)	99	44/50	372 (38)	93	38/50

< > : No.of effective animals, () : No.of measured animals, Av.Wt. : Average body weight(Unit:g)

TABLE 2 SURVIVAL ANIMAL NUMBERS AND BODY WEIGHT CHANGES OF FEMALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Weeks on Study	Control		600ppm			1200ppm			2400ppm		
	Av.Wt.	No.of Surviv.	Av.Wt.	% of cont.	No.of Surviv.	Av.Wt.	% of cont.	No.of Surviv.	Av.Wt.	% of cont.	No.of Surviv.
	<50>		<50>			<50>			<50>		
0	98 (50)	50/50	98 (50)	100	50/50	98 (50)	100	50/50	98 (50)	100	50/50
1	114 (50)	50/50	112 (50)	98	50/50	113 (50)	99	50/50	111 (50)	97	50/50
2	128 (50)	50/50	125 (50)	98	50/50	126 (50)	98	50/50	123 (50)	96	50/50
3	138 (50)	50/50	136 (50)	99	50/50	136 (50)	99	50/50	133 (50)	96	50/50
4	148 (50)	50/50	144 (50)	97	50/50	144 (50)	97	50/50	141 (50)	95	50/50
5	155 (50)	50/50	151 (50)	97	50/50	152 (50)	98	50/50	147 (50)	95	50/50
6	159 (50)	50/50	156 (50)	98	50/50	156 (50)	98	50/50	151 (50)	95	50/50
7	165 (50)	50/50	161 (50)	98	50/50	162 (50)	98	50/50	157 (50)	95	50/50
8	170 (50)	50/50	167 (50)	98	50/50	167 (50)	98	50/50	162 (50)	95	50/50
9	175 (50)	50/50	172 (50)	98	50/50	171 (50)	98	50/50	166 (50)	95	50/50
10	178 (50)	50/50	175 (50)	98	50/50	174 (50)	98	50/50	169 (50)	95	50/50
11	183 (50)	50/50	179 (50)	98	50/50	178 (50)	97	50/50	172 (50)	94	50/50
12	185 (50)	50/50	182 (50)	98	50/50	181 (50)	98	50/50	175 (50)	95	50/50
13	187 (50)	50/50	183 (50)	98	50/50	184 (50)	98	50/50	176 (50)	94	50/50
14	189 (50)	50/50	186 (50)	98	50/50	186 (50)	98	50/50	180 (50)	95	50/50
18	197 (50)	50/50	190 (50)	96	50/50	192 (50)	97	50/50	184 (50)	93	50/50
22	201 (50)	50/50	197 (50)	98	50/50	199 (50)	99	50/50	190 (50)	95	50/50
26	209 (50)	50/50	204 (50)	98	50/50	205 (50)	98	50/50	195 (50)	93	50/50
30	211 (50)	50/50	208 (50)	99	50/50	211 (50)	100	50/50	199 (50)	94	50/50
34	218 (50)	50/50	216 (50)	99	50/50	219 (50)	100	50/50	206 (50)	94	50/50
38	223 (50)	50/50	222 (50)	100	50/50	224 (50)	100	50/50	210 (50)	94	50/50
42	227 (50)	50/50	228 (50)	100	50/50	230 (50)	101	50/50	218 (50)	96	50/50
46	231 (50)	50/50	232 (50)	100	50/50	233 (50)	101	50/50	222 (50)	96	50/50
50	234 (50)	50/50	235 (50)	100	50/50	236 (50)	101	50/50	222 (50)	95	50/50
54	240 (50)	50/50	240 (50)	100	50/50	240 (50)	100	50/50	226 (50)	94	50/50
58	246 (50)	50/50	246 (50)	100	50/50	246 (50)	100	50/50	229 (50)	93	50/50
62	252 (50)	50/50	256 (49)	102	49/50	256 (50)	102	50/50	237 (50)	94	50/50
66	259 (50)	50/50	260 (49)	100	49/50	261 (50)	101	50/50	238 (49)	92	49/50
70	260 (50)	50/50	264 (49)	102	49/50	263 (50)	101	50/50	240 (48)	92	48/50
74	264 (49)	49/50	268 (49)	102	49/50	268 (50)	102	50/50	245 (48)	93	48/50
78	268 (49)	49/50	270 (49)	101	49/50	272 (50)	101	50/50	247 (48)	92	48/50
82	275 (49)	49/50	276 (49)	100	49/50	276 (50)	100	50/50	254 (47)	92	47/50
86	278 (49)	49/50	280 (48)	101	48/50	280 (50)	101	50/50	257 (46)	92	46/50
90	283 (49)	49/50	282 (48)	100	48/50	282 (48)	100	48/50	257 (46)	91	46/50
94	283 (45)	45/50	284 (47)	100	47/50	286 (48)	101	48/50	259 (43)	92	43/50
98	282 (45)	45/50	285 (47)	101	47/50	288 (48)	102	48/50	263 (41)	93	41/50
102	284 (43)	43/50	285 (44)	100	44/50	292 (47)	103	47/50	264 (38)	93	38/50
104	280 (42)	42/50	282 (44)	101	44/50	291 (47)	104	47/50	262 (36)	94	36/50

< > : No.of effective animals, () : No.of measured animals, Av.Wt. : Average body weight(Unit:g)

TABLE 3 INCIDENCES OF EXTERNAL AND INTERNAL MASSES IN CLINICAL OBSERVATION OF MALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Time of mass occurrence (week)	0~13	14~26	27~39	40~52	53~65	66~78	79~91	92~104	0~104
External mass									
Control	0/50	0/50	0/50	0/50	1/50	2/49	4/48	13/44	14/50 (2/10)
600ppm	0/50	0/50	0/50	0/50	1/50	4/50	7/49	14/49	14/50 (2/10)
1200ppm	0/50	0/50	0/50	0/50	0/49	0/49	2/48	12/47	12/50 (1/6)
2400ppm	0/50	1/50	1/50	0/49	0/49	3/49	6/48	9/43	11/50 (2/12)
Internal mass									
Control	0/50	0/50	0/50	0/50	0/50	0/49	0/48	1/44	1/50 (0/10)
600ppm	0/50	0/50	0/50	0/50	0/50	0/50	0/49	1/49	1/50 (1/10)
1200ppm	0/50	0/50	0/50	0/50	0/49	0/49	0/48	1/47	1/50 (0/6)
2400ppm	0/50	0/50	0/50	0/49	0/49	0/49	1/48	1/43	2/50 (1/12)
No. of animals with mass / No. of survival animals at first week on each period. (No. of dead and moribund animals with mass / No. of dead and moribund animals)									

TABLE 4 INCIDENCES OF EXTERNAL AND INTERNAL MASSES IN CLINICAL OBSERVATION OF FEMALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Time of mass occurrence (week)	0~13	14~26	27~39	40~52	53~65	66~78	79~91	92~104	0~104
External mass									
Control	0/50	0/50	0/50	0/50	0/50	5/50	8/49	11/48	12/50 (4/8)
600ppm	0/50	0/50	0/50	0/50	0/50	1/49	6/49	12/47	13/50 (2/6)
1200ppm	0/50	0/50	0/50	0/50	2/50	2/50	7/50	14/48	15/50 (0/3)
2400ppm	0/50	0/50	0/50	0/50	1/50	2/49	4/48	7/46	7/50 (2/14)
Internal mass									
Control	0/50	0/50	0/50	0/50	0/50	1/50	1/49	1/48	2/50 (2/8)
600ppm	0/50	0/50	0/50	0/50	0/50	1/49	1/49	2/47	3/50 (1/6)
1200ppm	0/50	0/50	0/50	0/50	0/50	0/50	0/50	1/48	1/50 (0/3)
2400ppm	0/50	0/50	0/50	0/50	0/50	0/49	0/48	3/46	3/50 (3/14)
No. of animals with mass / No. of survival animals at first week on each period. (No. of dead and moribund animals with mass / No. of dead and moribund animals)									

TABLE 5 FOOD CONSUMPTION CHANGES OF MALE RATS IN THE 2-YEAR
INHALATION STUDY OF CYCLOHEXENE

Weeks on Study	Control		600ppm		1200ppm		2400ppm	
	Av.Fc.		Av.Fc.	% of cont.	Av.Fc.	% of cont.	Av.Fc.	% of cont.
	<50>		<50>		<50>		<50>	
1	16.0	(50)	15.7	(50) 98	15.3	(50) 96	15.0	(50) 94
2	17.5	(50)	17.5	(50) 100	17.0	(50) 97	16.7	(50) 95
3	18.3	(50)	18.1	(50) 99	17.8	(50) 97	17.5	(50) 96
4	18.6	(50)	18.4	(50) 99	18.2	(50) 98	17.9	(50) 96
5	18.1	(50)	18.1	(50) 100	18.2	(50) 101	18.2	(50) 101
6	18.0	(50)	17.9	(50) 99	18.1	(50) 101	17.9	(50) 99
7	17.5	(50)	17.6	(50) 101	17.6	(50) 101	17.8	(50) 102
8	17.5	(50)	17.7	(50) 101	17.5	(50) 100	17.7	(50) 101
9	17.6	(50)	17.9	(50) 102	17.8	(50) 101	18.0	(50) 102
10	17.5	(50)	17.8	(50) 102	17.8	(50) 102	17.9	(50) 102
11	17.4	(50)	17.8	(50) 102	17.7	(50) 102	18.0	(50) 103
12	17.5	(50)	17.7	(50) 101	17.6	(50) 101	17.6	(50) 101
13	17.1	(50)	17.5	(50) 102	17.4	(50) 102	17.6	(50) 103
14	17.1	(50)	17.3	(50) 101	17.4	(50) 102	17.4	(50) 102
18	16.9	(50)	17.2	(50) 102	17.0	(50) 101	17.0	(50) 101
22	17.2	(50)	17.5	(50) 102	17.6	(50) 102	17.3	(50) 101
26	17.2	(50)	17.5	(50) 102	17.5	(50) 102	17.3	(50) 101
30	17.0	(50)	17.4	(50) 102	17.5	(50) 103	17.2	(50) 101
34	17.0	(50)	17.6	(50) 104	17.8	(50) 105	17.6	(49) 104
38	16.4	(50)	16.7	(50) 102	16.9	(50) 103	16.9	(49) 103
42	16.6	(50)	17.2	(50) 104	17.4	(50) 105	17.9	(49) 108
46	16.7	(50)	17.2	(50) 103	17.3	(50) 104	17.5	(49) 105
50	16.6	(50)	16.9	(50) 102	16.9	(49) 102	17.1	(49) 103
54	17.0	(50)	17.3	(50) 102	17.4	(49) 102	17.2	(49) 101
58	16.6	(50)	17.3	(50) 104	17.4	(49) 105	17.3	(49) 104
62	17.0	(49)	17.5	(50) 103	17.7	(49) 104	17.6	(49) 104
66	17.1	(49)	17.2	(50) 101	17.3	(49) 101	17.3	(49) 101
70	17.1	(49)	17.4	(50) 102	17.3	(49) 101	17.3	(48) 101
74	17.3	(48)	17.5	(50) 101	17.8	(48) 103	18.0	(48) 104
78	16.9	(48)	17.1	(50) 101	17.2	(48) 102	17.4	(48) 103
82	16.9	(47)	17.1	(49) 101	17.2	(48) 102	17.2	(47) 102
86	16.4	(47)	16.6	(49) 101	17.3	(48) 105	17.0	(45) 104
90	16.8	(44)	17.2	(49) 102	17.4	(48) 104	17.1	(43) 102
94	16.8	(43)	17.3	(46) 103	17.6	(47) 105	17.4	(42) 104
98	16.5	(43)	16.5	(45) 100	17.6	(45) 107	17.0	(41) 103
102	16.1	(40)	16.7	(42) 104	17.3	(44) 107	16.8	(40) 104
104	14.9	(40)	16.6	(40) 111	16.5	(44) 111	16.8	(38) 113

< > : No.of effective animals, () : No.of measured animals, Av.Fc. : Average food consumption(Unit:g)

TABLE 6 FOOD CONSUMPTION CHANGES OF FEMALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Weeks on Study	Control		600ppm		1200ppm		2400ppm	
	Av.Fc.		Av.Fc.	% of cont.	Av.Fc.	% of cont.	Av.Fc.	% of cont.
	<50>		<50>		<50>		<50>	
1	11.9	(50)	11.5	(50) 97	11.4	(50) 96	11.1	(50) 93
2	12.3	(50)	12.4	(50) 101	12.1	(50) 98	11.8	(50) 96
3	12.6	(50)	12.6	(50) 100	12.7	(50) 101	12.3	(50) 98
4	12.8	(50)	12.6	(50) 98	12.7	(50) 99	12.7	(49) 99
5	12.9	(50)	12.8	(50) 99	12.8	(50) 99	12.5	(50) 97
6	11.9	(50)	12.1	(50) 102	12.2	(50) 103	12.2	(50) 103
7	12.1	(50)	12.1	(50) 100	12.6	(50) 104	12.5	(50) 103
8	12.1	(50)	12.1	(50) 100	12.0	(50) 99	12.0	(50) 99
9	12.4	(50)	12.1	(50) 98	12.2	(50) 98	12.1	(50) 98
10	12.3	(50)	12.4	(50) 101	11.9	(50) 97	12.1	(50) 98
11	12.5	(50)	12.1	(50) 97	12.2	(50) 98	12.1	(50) 97
12	12.2	(50)	12.6	(50) 103	12.1	(50) 99	12.2	(50) 100
13	12.1	(50)	12.6	(50) 104	12.2	(50) 101	12.0	(50) 99
14	12.1	(50)	12.1	(50) 100	12.1	(50) 100	12.1	(50) 100
18	12.0	(50)	11.7	(50) 98	11.7	(50) 98	11.7	(50) 98
22	12.0	(50)	12.4	(50) 103	12.4	(50) 103	12.2	(50) 102
26	11.8	(50)	12.0	(50) 102	11.9	(50) 101	11.6	(50) 98
30	11.9	(50)	11.9	(50) 100	12.4	(50) 104	12.0	(50) 101
34	11.9	(50)	12.2	(50) 103	12.2	(50) 103	12.6	(50) 106
38	11.6	(50)	12.0	(50) 103	11.8	(50) 102	11.7	(50) 101
42	11.6	(50)	12.2	(50) 105	12.1	(50) 104	12.4	(50) 107
46	11.9	(50)	12.2	(50) 103	12.3	(50) 103	12.4	(50) 104
50	11.8	(50)	11.9	(50) 101	12.1	(50) 103	12.1	(50) 103
54	12.1	(50)	12.7	(50) 105	12.6	(50) 104	12.1	(50) 100
58	12.0	(50)	12.6	(50) 105	12.4	(50) 103	12.1	(50) 101
62	12.2	(50)	12.9	(49) 106	12.7	(50) 104	12.4	(50) 102
66	12.3	(50)	12.6	(49) 102	12.6	(50) 102	12.5	(49) 102
70	12.3	(50)	12.9	(49) 105	12.6	(50) 102	12.2	(48) 99
74	12.8	(49)	13.1	(49) 102	13.4	(50) 105	13.3	(48) 104
78	12.7	(49)	12.7	(49) 100	13.2	(50) 104	12.8	(48) 101
82	12.6	(49)	13.0	(49) 103	12.9	(50) 102	12.8	(47) 102
86	12.3	(49)	12.9	(48) 105	12.9	(50) 105	12.9	(46) 105
90	12.9	(49)	12.9	(48) 100	13.3	(48) 103	12.7	(46) 98
94	12.8	(45)	13.4	(47) 105	13.4	(48) 105	12.8	(43) 100
98	12.4	(45)	13.0	(47) 105	13.7	(48) 110	13.0	(41) 105
102	12.7	(43)	12.6	(44) 99	13.5	(47) 106	12.9	(38) 102
104	12.6	(42)	12.6	(44) 100	13.4	(47) 106	12.7	(36) 101

< > : No.of effective animals, () : No.of measured animals, Av.Fc. : Average food consumption(Unit:g)

TABLE 7 BIOCHEMISTRY OF MALE RATS IN THE 2-YEAR
INHALATION STUDY OF CYCLOHEXENE

Group Name	Control	600 ppm	1200 ppm	2400 ppm
No. of examined animals	40	38	43	38
T-cholesterol (mg/dL)	168 ± 61	190 ± 66	230 ± 92	** 205 ± 70 *
Triglyceride (mg/dL)	91 ± 68	128 ± 82	199 ± 162	** 154 ± 127 *
Phospholipid (mg/dL)	242 ± 86	269 ± 79	330 ± 135	** 291 ± 88 *
γ -GTP (IU/L)	10 ± 9	12 ± 7	16 ± 10	** 23 ± 18 **
Urea nitrogen (mg/dL)	19.9 ± 6.2	21.8 ± 4.9	* 28.2 ± 19.0	** 28.7 ± 24.7 **
Creatinine (mg/dL)	0.6 ± 0.1	0.6 ± 0.1	0.8 ± 0.4	** 0.8 ± 0.8 **
Calcium (mg/dL)	10.4 ± 0.3	10.6 ± 0.5	11.0 ± 0.6	** 10.8 ± 0.4 **
Inorganic phosphorus (mg/dL)	4.1 ± 0.7	4.3 ± 0.7	4.8 ± 1.2	** 4.9 ± 3.4

Mean ± S.D.

Significant difference: * : p<0.05 ** : p<0.01 Test of Dunnett

TABLE 8 URINALYSIS OF MALE RATS IN THE 2-YEAR
INHALATION STUDY OF CYCLOHEXENE

Group Name	Grade	Control	600 ppm	1200 ppm	2400 ppm
No. of examined animals		39	40	44	39
Protein	-	0	0	0	0
	±	0	0	0	0
	1+	0	0	0	0
	2+	5	4	1	2
	3+	25	20	20	18
	4+	9	16	23	19
Chi square test				*	*
Significant difference: * : p<0.05 ** : p<0.01 Chi square test					

TABLE 9 URINALYSIS OF FEMALE RATS IN THE 2-YEAR
INHALATION STUDY OF CYCLOHEXENE

Group Name	Grade	Control	600 ppm	1200 ppm	2400 ppm
No. of examined animals		42	44	47	37
pH	5.0	0	0	0	0
	6.0	0	0	1	1
	6.5	7	4	4	3
	7.0	6	9	3	1
	7.5	9	11	10	5
	8.0	19	17	23	18
	8.5	1	3	6	9
Chi square test					*
Significant difference: * : p<0.05 ** : p<0.01 Chi square test					

TABLE 10 ORGAN WEIGHTS OF MALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Group Name	Control	600 ppm	1200 ppm	2400 ppm	
No. of examined animals	40	40	44	38	
Body weight (g)	379 ± 44	383 ± 37	371 ± 32	347 ± 31	**
Testes (g)	3.942 ± 1.405	4.754 ± 1.396	4.284 ± 1.836	4.816 ± 1.517	*
Testes (%)	1.038 ± 0.340	1.243 ± 0.342	1.147 ± 0.487	1.379 ± 0.420	**
Heart (g)	1.246 ± 0.098	1.244 ± 0.128	1.264 ± 0.107	1.222 ± 0.103	
Heart (%)	0.332 ± 0.039	0.327 ± 0.036	0.343 ± 0.043	0.354 ± 0.036	*
Lung (g)	1.487 ± 0.133	1.512 ± 0.150	1.565 ± 0.294	1.498 ± 0.188	
Lung (%)	0.399 ± 0.075	0.398 ± 0.050	0.425 ± 0.093	0.435 ± 0.075	**
Kidneys (g)	2.619 ± 0.288	2.757 ± 0.244	2.864 ± 0.310	2.713 ± 0.288	**
Kidneys (%)	0.705 ± 0.156	0.725 ± 0.086	0.776 ± 0.097	0.784 ± 0.083	**
Liver (g)	10.838 ± 1.751	11.435 ± 1.443	12.353 ± 1.854	11.976 ± 2.211	*
Liver (%)	2.882 ± 0.523	2.984 ± 0.226	3.341 ± 0.528	3.452 ± 0.618	**
Brain (g)	2.025 ± 0.048	2.025 ± 0.052	2.026 ± 0.080	1.974 ± 0.057	**
Brain (%)	0.543 ± 0.078	0.534 ± 0.059	0.550 ± 0.050	0.573 ± 0.055	**

Mean ± S.D.

Significant difference: * : p<0.05 ** : p<0.01 Test of Dunnett

TABLE 11 ORGAN WEIGHTS OF FEMALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Group Name	Control	600 ppm	1200 ppm	2400 ppm	
No. of examined animals	42	44	47	36	
Body weight (g)	263 ± 44	263 ± 34	273 ± 30	244 ± 25	*
Adrenals (g)	0.082 ± 0.015	0.089 ± 0.063	0.083 ± 0.011	0.081 ± 0.008	
Adrenals (%)	0.032 ± 0.007	0.034 ± 0.022	0.031 ± 0.005	0.033 ± 0.004	*
Ovaries(g)	0.218 ± 0.396	0.158 ± 0.113	0.137 ± 0.053	0.135 ± 0.027	
Ovaries(%)	0.079 ± 0.124	0.060 ± 0.042	0.051 ± 0.022	0.055 ± 0.010	**
Lung (g)	1.066 ± 0.144	1.087 ± 0.209	1.083 ± 0.110	1.077 ± 0.082	
Lung (%)	0.414 ± 0.069	0.423 ± 0.120	0.400 ± 0.047	0.446 ± 0.064	**
Spleen (g)	0.582 ± 0.230	0.816 ± 1.065	0.827 ± 1.316	0.566 ± 0.178	
Spleen (%)	0.225 ± 0.090	0.340 ± 0.532	0.307 ± 0.491	0.232 ± 0.066	*
Liver (g)	6.969 ± 1.802	7.024 ± 1.149	7.348 ± 1.247	6.654 ± 0.769	
Liver (%)	2.670 ± 0.609	2.697 ± 0.503	2.697 ± 0.352	2.729 ± 0.220	**
Brain(g)	1.851 ± 0.052	1.859 ± 0.062	1.855 ± 0.066	1.789 ± 0.052	**
Brain(%)	0.723 ± 0.119	0.720 ± 0.112	0.687 ± 0.070	0.741 ± 0.090	

Mean ± S.D.

Significant difference: * : p<0.05 ** : p<0.01 Test of Dunnett

TABLE 12 INCIDENCES OF SELECTED LESIONS OF MALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Group		Control	600 ppm	1200 ppm	2400 ppm	Peto	Cochran-
Number of examined animals		50	50	50	50	test	Armitage
Organ	Grade of non-neoplastic finding						test
Findings							
Nasal cavity							
Mineralization	1+	32	25	37	21		
	Chi square test				*		
Liver							
Acidophilic cell focus	1+	3	7	8	8		
	2+	0	0	1	3		
	Chi square test				*		
Clear cell focus	1+	7	8	9	8		
	2+	3	0	3	1		
	Chi square test						
Basophilic cell focus	1+	9	6	8	9		
	2+	2	3	4	4		
	Chi square test						
Vacuolated cell focus	1+	2	0	1	1		
	Chi square test						
Spongiosis hepatitis	1+	2	3	9	13		
	2+	0	2	1	5		
	Chi square test			*	**		
Hepatocellular adenoma 1)		2	1	4	4		
Hepatocellular carcinoma 2)		0	0	0	1		
1)+2)		2	1	4	5		↑
Kidney							
Chronic nephropathy	1+	9	6	4	4		
	2+	23	20	15	15		
	3+	15	20	24	24		
	4+	1	2	6	5		
	Chi square test			*			
Thyroid							
Focal follicular cell hyperplasia	1+	0	1	2	2		
	2+	0	0	1	5		
	Chi square test				*		
Brain							
Degeneration: granular cell	1+	0	0	0	1		
	2+	0	0	0	1		
	3+	0	0	0	4		
	Chi square test						
Grade	1+: Slight	2+: Moderate	3+: Marked	4+: Severe			
Significant difference	* : p<0.05	** : p<0.01			Chi square test for non-neoplastic lesion		
					Fisher's exact test for neoplastic lesion		
					Peto or Cochran-Armitage test for neoplastic lesion		
					↑(↓) : p<0.05 ↑↑(↓↓) : p<0.01		
The combined incidences indicate the tumor-bearing animals but not the tumors.							

TABLE 13 INCIDENCES OF SELECTED LESIONS OF FEMALE RATS IN THE 2-YEAR
INHALATION STUDY OF CYCLOHEXENE

Group		Control	600 ppm	1200 ppm	2400 ppm	Peto	Cochran-
Number of examined animals		50	50	50	50	test	Armitage
Organ	Grade of non-neoplastic finding						test
Findings							
Subcutis							
Fibroma		4	2	0	0		↓
Nasal cavity							
Mineralization	1+	31	18	16	17		
	Chi square test		*	**	**		
Brain							
Degeneration: granular cell	1+	0	0	0	0		
	2+	0	0	0	1		
	3+	0	0	0	5		
	Chi square test				*		
Grade	1+: Slight	2+: Moderate	3+: Marked				
Significant difference	* : p<0.05	** : p<0.01		Chi square test for non-neoplastic lesion			
				Fisher's exact test for neoplastic lesion			
	↑(↓) : p<0.05	↑↑(↓↓) : p<0.01		Peto or Cochran-Armitage test for neoplastic lesion			
The combined incidences indicate the tumor-bearing animals but not the tumors.							

TABLE 14 CAUSE OF DEATH OF MALE AND FEMALE RATS IN THE 2-YEAR INHALATION STUDY OF CYCLOHEXENE

Group	Male				Female			
	Control	600 ppm	1200 ppm	2400 ppm	Control	600 ppm	1200 ppm	2400 ppm
Number of dead or moribund animals	10	10	6	12	8	6	3	14
No microscopical confirmation	0	0	1	0	0	0	0	0
Respiratory system lesion	0	0	0	1	0	0	0	0
Central nervous system lesion	0	0	0	2	0	0	0	3
Tumor death : leukemia	3	4	1	1	4	1	1	5
subcutis	0	0	0	1	1	1	0	0
bone marrow	1	0	0	0	0	0	0	0
liver	0	0	0	1	0	0	0	0
pancreas	0	1	0	0	0	0	0	0
pituitary	3	2	2	2	2	3	2	3
thyroid	0	0	1	0	0	0	0	0
adrenal	2	0	0	1	0	0	0	0
uterus	—	—	—	—	0	0	0	1
mammary gland	0	0	0	0	1	0	0	1
clitoral gland	—	—	—	—	0	0	0	1
brain	0	1	0	0	0	1	0	0
Zymbal gland	1	0	0	0	0	0	0	0
bone	0	1	0	2	0	0	0	0
vertebra	0	0	0	1	0	0	0	0
peritoneum	0	1	1	0	0	0	0	0

TABLE 15 HISTORICAL CONTROL DATA OF SELECTED NEOPLASTIC LESIONS
IN JAPAN BIOASSAY RESEARCH CENTER : F344/DuCrj MALE RATS

Organs	No. of animals examined	No. of animals bearing tumors	Incidence (%)	Min. - Max. (%)
Tumors				
Liver	<1499>			
Hepatocellular adenoma 1)		21	1.4	0 - 6
Hepatocellular carcinoma 2)		4	0.3	0 - 2
1)+2)		25	1.7	0 - 6

30 carcinogenicity studies examined in Japan Bioassay Research Center were used.
Study No. : 0043, 0059, 0061, 0063, 0065, 0067, 0095, 0104, 0115, 0130, 0141, 0158, 0162, 0189, 0205, 0210, 0224, 0242, 0267, 0269, 0278, 0284, 0288, 0294, 0296, 0318, 0328, 0342, 0347, 0365

TABLE 16 HISTORICAL CONTROL DATA OF SELECTED NEOPLASTIC LESIONS
IN JAPAN BIOASSAY RESEARCH CENTER : F344/DuCrj FEMALE RATS

Organs	No. of animals examined	No. of animals bearing tumors	Incidence (%)	Min. - Max. (%)
Tumors				
Subcutis	<1447>			
Fibroma		16	2.4	0 - 4

29 carcinogenicity studies examined in Japan Bioassay Research Center were used.
Study No. : 0043, 0059, 0061, 0063, 0065, 0067, 0095, 0104, 0115, 0130, 0141, 0158, 0162, 0189, 0205, 0210, 0224, 0242, 0267, 0269, 0278, 0284, 0296, 0303, 0318, 0328, 0342, 0347, 0365