グリオキサルのラットを用いた経口投与による
が ん 原 性 試 験（混 水 試 験）報 告 書

試験番号：0267

TABLES

TABLES

TABLE 1 EXPERIMENTAL DESIGN AND MATERIALS AND METHODS IN THE DRINKING WATER STUDY OF GLYOXAL

2-year study

<Method of Administration>
drinking water
<Number of Groups>
Male 4, Female 4
<Size of Groups>
50 males and 50 females of each group
<Animals>
Strain and Species
F344/DuCrj(Fischer)rat
Animal Source
Charles River Japan, Inc.
Duration Held Before Study
2 wk
Age When Placed on Study
6 wk
Age When Killed
111 wk
<Doses>
Male and Female
0, 750, 1500 or 3000ppm
<Duration of Dosing>
7 d/wk for 104 wk
<Animal Maintenance>
Feed
CRF-1 (Oriental Yeast Co., Ltd.)
Sterilized by γ -ray
Available *ad libitum*
Water
Filtrated and sterilized by ultraviolet ray
Automatic watering system in duration of quarantine
Glass bottle in duration of acclimation and administration
Available *ad libitum*
Animal per Cage
Single (stainless steel wire)
Animal Room Environment
Barrier system
Temperature : 24±2℃
Humidity : 55±10%
Fluorescent light 12 h/d
15~17 room air changes /h
<Type and Frequency of Observation>
Clinical Sign
Observed 1 per d
Body Weight
Weighed 1 per wk for 14wk
Weighed 1 per 4wks thereafter
Water Consumption
Weighed 1 per wk for 14wk
Weighed 1 per 4wks thereafter
Food Consumption
Weighed 1 per wk for 14wk
Weighed 1 per 4wks thereafter

TABLE 1 (Continued) EXPERIMENTAL DESIGN AND MATERIALS AND METHODS IN THE DRINKING WATER STUDY OF GLYOXAL

2-year study

<Hematology>

Hematological examination performed on scheduled sacrificed animals.
The following measurement parameters were examined;
Red blood cell (RBC), Hemoglobin, Hematocrit,
Mean corpuscular volume (MCV),
Mean corpuscular hemoglobin (MCH),
Mean corpuscular hemoglobin concentrate (MCHC),
Platelet, White blood cell (WBC),
Differential WBC,

<Biochemistry>

Biochemistrical examination performed on scheduled sacrificed animals.
The following measurement parameters were examined;
Total protein, Albumin, A/G ratio,
Total bilirubin, Glucose, Total cholesterol,
Phospholipid, Triglyceride,
Glutamic oxaloacetic transaminase (GOT),
Glutamic pyruvic transaminase (GPT),
Alkaline phosphatase(ALP),
Lactate dehydrogenase (LDH),
γ -Glutamyl transpeptidase(γ -GPT),
Creatine phosphokinase (CPK),
Urea nitrogen, Creatinine, Sodium,
Potassium, Chloride,
Calcium, Inorganic phosphorus.

<Urinalysis>

Urinalysis performed on all animals that survived to end of dosing period using fresh urine collection.
The following measurement parameters were examined;
pH, Protein, Glucose, Ketone body, Bilirubin,
Occult blood, Urobilinogen.

<Necropsy>

Necropsy performed on all animals.

<Organ Weight>

Organ weight measurement performed on scheduled sacrificed animals.
The following organs were weighed;
brain, lung, liver, spleen, heart, kidney, adrenal,
testis, ovary.

<Histopathologic Examination>

Histopathologic examination performed on all animals per sex per groups.
The following organs were examined;
skin, nasal cavity, nasopharynx, larynx, trachea, lung,
bone marrow, lymph node, thymus, spleen, heart, tongue,
salivary gland, esophagus, stomach, small intestine,
large intestine, liver, pancreas,
kidney, urinary bladder, pituitary, thyroid,
parathyroid, adrenal, testis, epididymis, seminal vesicle,
prostate,ovary, uterus, vagina,
mammary gland, brain, spinal cord, peripheral nerve,
eye, harderian gland, muscle, bone.

TABLE 2 SURVIVAL ANIMAL NUMBERS AND BODY WEIGHT CHANGES OF MALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Week on Study	Control Av.Wt.	Control No. of Surviv.	750ppm Av.Wt.	750ppm % of cont.	750ppm No. of Surviv.	1500ppm Av.Wt.	1500ppm % of cont.	1500ppm No. of Surviv.	3000ppm Av.Wt.	3000ppm % of cont.	3000ppm No. of Surviv.
	<50>		<50>			<50>			<50>		
0	123 (50)	50/50	123 (50)	100	50/50	123 (50)	100	50/50	123 (50)	100	50/50
1	152 (50)	50/50	150 (50)	99	50/50	145 (50)	95	50/50	136 (50)	89	50/50
2	180 (50)	50/50	176 (50)	98	50/50	170 (50)	94	50/50	158 (50)	88	50/50
3	203 (50)	50/50	196 (50)	97	50/50	190 (50)	94	50/50	176 (50)	87	50/50
4	222 (50)	50/50	212 (50)	95	50/50	207 (50)	93	50/50	190 (50)	86	50/50
5	238 (50)	50/50	226 (50)	95	50/50	223 (50)	94	50/50	204 (50)	86	50/50
6	251 (50)	50/50	240 (50)	96	50/50	236 (50)	94	50/50	216 (50)	86	50/50
7	263 (50)	50/50	252 (50)	96	50/50	248 (50)	94	50/50	226 (50)	86	50/50
8	272 (50)	50/50	262 (50)	96	50/50	259 (50)	95	50/50	235 (50)	86	50/50
9	282 (50)	50/50	272 (50)	96	50/50	269 (50)	95	50/50	245 (50)	87	50/50
10	292 (50)	50/50	281 (50)	96	50/50	278 (50)	95	50/50	252 (50)	86	50/50
11	300 (50)	50/50	290 (50)	97	50/50	287 (50)	96	50/50	259 (50)	86	50/50
12	307 (50)	50/50	296 (50)	96	50/50	292 (50)	95	50/50	263 (50)	86	50/50
13	316 (50)	50/50	306 (50)	97	50/50	302 (50)	96	50/50	272 (50)	86	50/50
14	320 (50)	50/50	310 (50)	97	50/50	306 (50)	96	50/50	276 (50)	86	50/50
18	339 (50)	50/50	330 (50)	97	50/50	325 (50)	96	50/50	293 (50)	86	50/50
22	361 (50)	50/50	351 (50)	97	50/50	344 (50)	95	50/50	309 (50)	86	50/50
26	379 (50)	50/50	369 (50)	97	50/50	359 (50)	95	50/50	323 (50)	85	50/50
30	394 (50)	50/50	385 (50)	98	50/50	373 (50)	95	50/50	333 (50)	85	50/50
34	407 (50)	50/50	398 (50)	98	50/50	385 (50)	95	50/50	343 (50)	84	50/50
38	419 (50)	50/50	410 (50)	98	50/50	395 (50)	94	50/50	352 (50)	84	50/50
42	430 (50)	50/50	421 (50)	98	50/50	405 (50)	94	50/50	361 (50)	84	50/50
46	440 (50)	50/50	432 (50)	98	50/50	415 (50)	94	50/50	367 (50)	83	50/50
50	449 (50)	50/50	440 (50)	98	50/50	422 (50)	94	50/50	372 (50)	83	50/50
54	454 (50)	50/50	447 (50)	98	50/50	428 (50)	94	50/50	378 (50)	83	50/50
58	462 (50)	50/50	453 (50)	98	50/50	432 (50)	94	50/50	381 (50)	82	50/50
62	469 (50)	50/50	461 (50)	98	50/50	440 (50)	94	50/50	384 (50)	82	50/50
66	475 (50)	50/50	466 (49)	98	49/50	445 (50)	94	50/50	387 (50)	81	50/50
70	479 (50)	50/50	469 (49)	98	49/50	444 (49)	93	49/50	387 (50)	81	50/50
74	481 (50)	50/50	474 (49)	99	49/50	445 (49)	93	49/50	387 (50)	80	50/50
78	487 (49)	49/50	478 (49)	98	49/50	446 (49)	92	49/50	387 (50)	79	50/50
82	489 (48)	48/50	479 (49)	98	49/50	444 (49)	91	48/50	383 (49)	78	49/50
86	481 (47)	48/50	479 (48)	100	48/50	446 (48)	93	48/50	383 (48)	80	48/50
90	481 (47)	47/50	473 (48)	98	48/50	446 (48)	93	48/50	381 (48)	79	48/50
94	474 (46)	46/50	472 (47)	100	47/50	443 (46)	93	46/50	375 (47)	79	47/50
98	470 (44)	44/50	465 (45)	99	45/50	440 (45)	94	45/50	368 (47)	78	47/50
102	457 (42)	42/50	458 (42)	100	42/50	432 (41)	95	41/50	360 (46)	79	46/50
104	452 (39)	39/50	454 (41)	100	41/50	425 (41)	94	41/50	353 (46)	78	46/50

< >:No. of effective animals, ( ):No. of measurement animals Av.Wt.: g

TABLE 3 SURVIVAL ANIMAL NUMBERS AND BODY WEIGHT CHANGES OF FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Week on Study	Control Av.Wt.	Control No. of Surviv.	750ppm Av.Wt.	750ppm % of cont.	750ppm No. of Surviv.	1500ppm Av.Wt.	1500ppm % of cont.	1500ppm No. of Surviv.	3000ppm Av.Wt.	3000ppm % of cont.	3000ppm No. of Surviv.
	<50>		<50>			<50>			<50>		
0	100 (50)	50/50	100 (50)	100	50/50	100 (50)	100	50/50	100 (50)	100	50/50
1	116 (50)	50/50	115 (50)	99	50/50	113 (50)	97	50/50	106 (50)	91	50/50
2	130 (50)	50/50	128 (50)	98	50/50	125 (50)	96	50/50	119 (50)	92	50/50
3	139 (50)	50/50	136 (50)	98	50/50	133 (50)	96	50/50	126 (50)	91	50/50
4	147 (50)	50/50	145 (50)	99	50/50	141 (50)	96	50/50	133 (50)	90	50/50
5	153 (50)	50/50	151 (50)	99	50/50	146 (50)	95	50/50	139 (50)	91	50/50
6	157 (50)	50/50	154 (50)	98	50/50	150 (50)	96	50/50	143 (50)	91	50/50
7	161 (50)	50/50	159 (50)	99	50/50	155 (50)	96	50/50	147 (50)	91	50/50
8	163 (50)	50/50	161 (50)	99	50/50	156 (50)	96	50/50	149 (50)	91	50/50
9	167 (50)	50/50	165 (50)	99	50/50	160 (50)	96	50/50	152 (50)	91	50/50
10	172 (50)	50/50	169 (50)	98	50/50	164 (50)	95	50/50	156 (50)	91	50/50
11	174 (50)	50/50	172 (50)	99	50/50	166 (50)	95	50/50	159 (50)	91	50/50
12	176 (50)	50/50	173 (50)	98	50/50	168 (50)	95	50/50	160 (50)	91	50/50
13	179 (50)	50/50	177 (50)	99	50/50	171 (50)	96	50/50	163 (50)	91	50/50
14	181 (50)	50/50	178 (50)	98	50/50	173 (50)	96	50/50	164 (50)	91	50/50
18	190 (50)	50/50	186 (50)	98	50/50	180 (50)	95	50/50	170 (50)	89	50/50
22	200 (50)	50/50	198 (50)	99	50/50	189 (50)	95	50/50	177 (50)	89	50/50
26	206 (50)	50/50	204 (50)	99	50/50	193 (50)	94	50/50	179 (50)	87	50/50
30	213 (50)	50/50	212 (50)	100	50/50	199 (50)	93	50/50	184 (50)	86	50/50
34	221 (50)	50/50	219 (50)	99	50/50	206 (50)	93	50/50	189 (50)	86	50/50
38	228 (50)	50/50	226 (50)	99	50/50	212 (50)	93	50/50	193 (50)	85	50/50
42	235 (50)	50/50	233 (50)	99	50/50	217 (50)	92	50/50	196 (50)	83	50/50
46	243 (50)	50/50	240 (50)	99	50/50	223 (50)	92	50/50	200 (50)	82	50/50
50	249 (50)	50/50	245 (50)	98	50/50	225 (50)	90	50/50	203 (50)	82	50/50
54	258 (50)	50/50	253 (50)	98	50/50	233 (50)	90	50/50	205 (50)	79	50/50
58	263 (50)	50/50	258 (50)	98	50/50	236 (50)	90	50/50	207 (50)	79	50/50
62	273 (50)	50/50	268 (50)	98	50/50	242 (50)	89	50/50	207 (50)	76	50/50
66	282 (50)	50/50	274 (50)	97	50/50	248 (50)	88	50/50	211 (50)	75	50/50
70	292 (50)	50/50	283 (50)	97	50/50	251 (50)	86	50/50	214 (50)	73	50/50
74	297 (50)	50/50	284 (50)	96	50/50	252 (50)	85	50/50	214 (49)	72	49/50
78	305 (50)	50/50	288 (50)	94	50/50	254 (50)	83	50/50	217 (47)	71	47/50
82	311 (50)	50/50	297 (49)	95	49/50	259 (49)	83	49/50	220 (46)	71	46/50
86	315 (50)	50/50	300 (48)	95	48/50	263 (49)	83	49/50	219 (44)	70	44/50
90	317 (50)	50/50	302 (47)	95	47/50	263 (48)	83	48/50	219 (44)	69	44/50
94	321 (47)	47/50	300 (46)	93	46/50	264 (47)	82	47/50	219 (43)	68	43/50
98	322 (44)	44/50	300 (44)	93	44/50	265 (44)	82	44/50	217 (43)	67	43/50
102	321 (40)	39/50	299 (42)	93	42/50	269 (42)	84	42/50	219 (40)	68	40/50
104	322 (38)	38/50	295 (41)	92	41/50	266 (42)	83	42/50	219 (39)	68	39/50

< >:No. of effective animals, ( ):No. of measurement animals Av.Wt.: g

TABLE 4 INCIDENCE OF EXTERNAL AND INTERNAL MASS IN CLINICAL OBSERVATION OF MALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

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	1/50	2/50	5/50	7/49	10/47	12/50(4/11)
	750ppm	0/50	0/50	0/50	0/50	0/50	0/49	6/49	14/47	14/50(2/ 9)
	1500ppm	0/50	0/50	0/50	1/50	3/50	5/50	6/49	6/47	10/50(6/ 9)
	3000ppm	0/50	0/50	0/50	0/50	2/50	1/50	3/50	6/47	7/50(0/ 4)
Internal mass										
	Control	0/50	0/50	0/50	0/50	0/50	0/50	0/49	2/47	2/50(2/11)
	750ppm	0/50	0/50	0/50	0/50	0/50	0/49	0/49	1/47	1/50(0/ 9)
	1500ppm	0/50	0/50	0/50	0/50	0/50	0/50	0/49	2/47	2/50(0/ 9)
	3000ppm	0/50	0/50	0/50	0/50	0/50	0/50	0/50	0/47	0/50(0/ 4)

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 INCIDENCE OF EXTERNAL AND INTERNAL MASS IN CLINICAL OBSERVATION OF FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

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	1/50	0/50	2/50	4/50	12/49	14/50(4/12)
	750ppm	0/50	0/50	0/50	1/50	1/50	2/50	8/50	17/46	18/50(4/ 9)
	1500ppm	0/50	0/50	0/50	0/50	1/50	2/50	8/50	11/47	14/50(2/ 8)
	3000ppm	0/50	0/50	0/50	0/50	0/50	2/50	2/47	5/43	7/50(2/11)
Internal mass										
	Control	0/50	0/50	0/50	0/50	0/50	0/50	1/50	5/49	5/50(2/12)
	750ppm	0/50	0/50	0/50	0/50	0/50	0/50	1/50	2/46	3/50(2/ 9)
	1500ppm	0/50	0/50	0/50	0/50	0/50	0/50	0/50	0/47	0/50(0/ 8)
	3000ppm	0/50	0/50	0/50	0/50	0/50	0/50	0/47	1/43	1/50(1/11)

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 6 WATER CONSUMPTION CHANGES OF MALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Week on Study	Control Av.Wt.	Control No. of Surviv.	750ppm Av.Wt.	750ppm % of cont.	750ppm No. of Surviv.	1500ppm Av.Wt.	1500ppm % of cont.	1500ppm No. of Surviv.	3000ppm Av.Wt.	3000ppm % of cont.	3000ppm No. of Surviv.
	<50>		<50>			<50>			<50>		
1	17.1 (50)	50/50	15.6 (50)	91	50/50	13.5 (50)	79	50/50	11.9 (50)	70	50/50
2	18.8 (50)	50/50	16.4 (50)	87	50/50	13.2 (50)	70	50/50	11.7 (50)	62	50/50
3	18.8 (50)	50/50	15.7 (50)	84	50/50	13.7 (50)	73	50/50	11.4 (50)	61	50/50
4	19.2 (50)	50/50	15.7 (50)	82	50/50	13.5 (50)	70	50/50	11.7 (50)	61	50/50
5	18.2 (50)	50/50	14.7 (50)	81	50/50	13.2 (50)	73	50/50	10.9 (50)	60	50/50
6	19.4 (50)	50/50	15.4 (50)	79	50/50	13.6 (50)	70	50/50	11.9 (50)	61	50/50
7	19.9 (50)	50/50	15.6 (50)	78	50/50	13.8 (50)	69	50/50	11.5 (50)	58	50/50
8	19.2 (50)	50/50	15.5 (50)	81	50/50	13.5 (50)	70	50/50	11.4 (50)	59	50/50
9	18.5 (50)	50/50	15.7 (50)	85	50/50	13.6 (50)	74	50/50	11.7 (50)	63	50/50
10	18.3 (50)	50/50	15.3 (50)	84	50/50	13.6 (50)	74	50/50	11.4 (50)	62	50/50
11	18.1 (48)	50/50	15.7 (50)	87	50/50	13.9 (50)	77	50/50	11.6 (50)	64	50/50
12	16.4 (50)	50/50	14.3 (50)	87	50/50	12.8 (50)	78	50/50	10.4 (50)	63	50/50
13	18.7 (50)	50/50	16.1 (50)	86	50/50	14.4 (50)	77	50/50	12.1 (50)	65	50/50
14	18.4 (50)	50/50	15.7 (50)	85	50/50	14.0 (50)	76	50/50	11.8 (50)	64	50/50
18	17.9 (50)	50/50	15.9 (50)	89	50/50	13.9 (50)	78	50/50	11.8 (50)	66	50/50
22	18.0 (50)	50/50	16.2 (50)	90	50/50	13.8 (50)	77	50/50	11.7 (50)	65	50/50
26	18.4 (50)	50/50	16.1 (50)	88	50/50	14.4 (50)	78	50/50	11.8 (50)	64	50/50
30	18.5 (50)	50/50	16.2 (50)	88	50/50	14.5 (50)	78	50/50	12.0 (50)	65	50/50
34	17.8 (49)	50/50	16.0 (50)	90	50/50	14.3 (50)	80	50/50	11.8 (50)	66	50/50
38	18.3 (50)	50/50	16.5 (50)	90	50/50	14.3 (50)	78	50/50	12.1 (50)	66	50/50
42	18.2 (50)	50/50	16.2 (50)	89	50/50	14.2 (50)	78	50/50	11.7 (49)	64	50/50
46	18.1 (50)	50/50	16.3 (50)	90	50/50	14.4 (50)	80	50/50	11.9 (50)	66	50/50
50	18.4 (50)	50/50	16.5 (50)	90	50/50	14.7 (50)	80	50/50	12.2 (50)	66	50/50
54	17.6 (50)	50/50	16.2 (50)	92	50/50	14.4 (50)	82	50/50	12.1 (50)	69	50/50
58	18.0 (50)	50/50	16.7 (50)	93	50/50	14.5 (50)	81	50/50	12.1 (50)	67	50/50
62	18.6 (50)	50/50	17.4 (50)	94	50/50	15.3 (50)	82	50/50	12.6 (50)	68	50/50
66	19.6 (50)	50/50	17.8 (49)	91	49/50	15.5 (50)	79	50/50	12.8 (50)	65	50/50
70	19.7 (50)	50/50	18.2 (49)	92	49/50	16.2 (49)	82	49/50	13.4 (50)	68	50/50
74	20.9 (50)	50/50	18.7 (49)	89	49/50	16.2 (49)	78	49/50	13.4 (50)	64	50/50
78	21.0 (49)	49/50	19.1 (49)	91	49/50	16.3 (49)	78	49/50	13.1 (50)	62	50/50
82	21.4 (48)	48/50	18.9 (49)	88	49/50	15.2 (49)	71	48/50	12.6 (49)	59	49/50
86	20.7 (48)	48/50	19.3 (48)	93	48/50	15.6 (47)	75	48/50	12.6 (48)	61	48/50
90	22.5 (47)	47/50	19.5 (48)	87	48/50	16.1 (48)	72	48/50	13.3 (48)	59	48/50
94	23.5 (46)	46/50	20.6 (47)	88	47/50	16.3 (46)	69	46/50	13.3 (47)	57	47/50
98	24.1 (44)	44/50	20.5 (45)	85	45/50	16.0 (45)	66	45/50	13.7 (47)	57	47/50
102	23.5 (42)	42/50	20.8 (42)	89	42/50	15.7 (41)	67	41/50	13.3 (46)	57	46/50
104	25.2 (39)	39/50	21.3 (41)	85	41/50	16.5 (41)	65	41/50	14.1 (46)	56	46/50

< >:No. of effective animals, ( ):No. of measurement animals Av.WC.: g

TABLE 7 WATER CONSUMPTION CHANGES OF FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Week on Study	Control Av.Wt.	Control No. of Surviv.	750ppm Av.Wt.	750ppm % of cont.	750ppm No. of Surviv.	1500ppm Av.Wt.	1500ppm % of cont.	1500ppm No. of Surviv.	3000ppm Av.Wt.	3000ppm % of cont.	3000ppm No. of Surviv.
	<50>		<50>			<50>			<50>		
1	14.5 (50)	50/50	13.1 (50)	90	50/50	10.7 (50)	74	50/50	9.8 (50)	68	50/50
2	17.8 (48)	50/50	13.4 (49)	75	50/50	10.7 (50)	60	50/50	9.8 (49)	55	50/50
3	17.1 (50)	50/50	12.9 (50)	75	50/50	10.5 (50)	61	50/50	8.9 (50)	52	50/50
4	18.1 (49)	50/50	12.7 (50)	70	50/50	10.3 (50)	57	50/50	9.1 (50)	50	50/50
5	19.0 (50)	50/50	12.7 (50)	67	50/50	10.2 (50)	54	50/50	9.0 (50)	47	50/50
6	19.9 (50)	50/50	12.5 (50)	63	50/50	9.9 (50)	50	50/50	8.9 (50)	45	50/50
7	19.4 (49)	50/50	12.2 (49)	63	50/50	10.3 (50)	53	50/50	9.3 (50)	48	50/50
8	15.9 (50)	50/50	11.5 (50)	72	50/50	9.4 (50)	59	50/50	8.4 (50)	53	50/50
9	15.3 (50)	50/50	11.9 (50)	78	50/50	9.3 (50)	61	50/50	7.7 (50)	50	50/50
10	19.0 (50)	50/50	12.8 (50)	67	50/50	10.0 (50)	53	50/50	8.6 (50)	45	50/50
11	17.8 (49)	50/50	12.8 (50)	72	50/50	9.9 (50)	56	50/50	8.6 (50)	48	50/50
12	18.7 (50)	50/50	12.4 (50)	66	50/50	9.5 (50)	51	50/50	8.1 (50)	43	50/50
13	19.8 (48)	50/50	14.4 (50)	73	50/50	10.4 (50)	53	50/50	8.6 (50)	43	50/50
14	20.3 (47)	50/50	14.0 (50)	69	50/50	10.5 (50)	52	50/50	8.6 (50)	42	50/50
18	16.7 (49)	50/50	12.3 (50)	74	50/50	9.7 (50)	58	50/50	8.1 (50)	49	50/50
22	21.1 (48)	50/50	15.1 (50)	72	50/50	10.4 (50)	49	50/50	9.0 (50)	43	50/50
26	21.1 (47)	50/50	15.8 (50)	75	50/50	11.3 (50)	54	50/50	9.6 (50)	45	50/50
30	20.2 (49)	50/50	15.5 (49)	77	50/50	10.9 (50)	54	50/50	9.7 (50)	48	50/50
34	19.6 (50)	50/50	15.5 (50)	79	50/50	11.4 (50)	58	50/50	9.8 (50)	50	50/50
38	19.1 (46)	50/50	16.0 (47)	84	50/50	11.4 (50)	60	50/50	10.0 (50)	52	50/50
42	17.1 (50)	50/50	14.4 (50)	84	50/50	10.6 (50)	62	50/50	9.8 (50)	57	50/50
46	17.5 (50)	50/50	15.0 (50)	86	50/50	10.9 (50)	62	50/50	10.2 (50)	58	50/50
50	16.7 (50)	50/50	13.9 (50)	83	50/50	10.7 (50)	64	50/50	10.7 (50)	64	50/50
54	17.0 (50)	50/50	15.4 (50)	91	50/50	11.8 (50)	69	50/50	11.5 (50)	68	50/50
58	15.9 (50)	50/50	13.9 (50)	87	50/50	11.7 (50)	74	50/50	11.3 (50)	71	50/50
62	17.2 (50)	50/50	15.0 (50)	87	50/50	12.6 (50)	73	50/50	12.5 (50)	73	50/50
66	17.8 (49)	50/50	14.9 (50)	84	50/50	12.7 (49)	71	50/50	12.6 (50)	71	50/50
70	17.9 (50)	50/50	14.5 (50)	81	50/50	13.7 (50)	77	50/50	13.4 (50)	75	50/50
74	18.1 (50)	50/50	14.9 (50)	82	50/50	13.9 (50)	77	50/50	13.4 (49)	74	49/50
78	19.2 (50)	50/50	14.9 (50)	78	50/50	14.8 (50)	77	50/50	13.8 (47)	72	47/50
82	18.8 (50)	50/50	14.8 (49)	79	49/50	14.7 (49)	78	49/50	14.3 (46)	76	46/50
86	18.5 (50)	50/50	15.3 (48)	83	48/50	15.8 (49)	85	49/50	14.1 (44)	76	44/50
90	20.2 (50)	50/50	16.4 (47)	81	47/50	16.6 (48)	82	48/50	16.2 (44)	80	44/50
94	20.4 (47)	47/50	15.5 (46)	76	46/50	17.7 (47)	87	47/50	16.0 (43)	78	43/50
98	20.6 (44)	44/50	15.8 (44)	77	44/50	17.5 (44)	85	44/50	15.6 (43)	76	43/50
102	20.5 (40)	39/50	15.5 (42)	76	42/50	18.1 (42)	88	42/50	15.4 (40)	75	40/50
104	21.0 (37)	38/50	16.2 (41)	77	41/50	18.0 (42)	86	42/50	15.7 (39)	75	39/50

< >:No. of effective animals, ( ):No. of measurement animals Av.WC.: g

TABLE 8 FOOD CONSUMPTION CHANGES OF MALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Week on Study	Control Av.Wt.	Control No. of Surviv.	750ppm Av.Wt.	750ppm % of cont.	750ppm No. of Surviv.	1500ppm Av.Wt.	1500ppm % of cont.	1500ppm No. of Surviv.	3000ppm Av.Wt.	3000ppm % of cont.	3000ppm No. of Surviv.
	<50>		<50>			<50>			<50>		
1	13.2 (50)	50/50	12.9 (50)	98	50/50	12.2 (50)	92	50/50	10.5 (50)	80	50/50
2	14.4 (50)	50/50	14.4 (50)	100	50/50	13.7 (50)	95	50/50	13.1 (50)	91	50/50
3	14.8 (50)	50/50	14.5 (50)	98	50/50	14.2 (50)	96	50/50	13.2 (50)	89	50/50
4	15.3 (50)	50/50	14.9 (50)	97	50/50	14.1 (50)	92	50/50	13.0 (50)	85	50/50
5	15.0 (50)	50/50	14.1 (50)	94	50/50	14.1 (50)	94	50/50	12.9 (50)	86	50/50
6	15.0 (50)	50/50	14.2 (50)	95	50/50	14.2 (50)	95	50/50	13.2 (50)	88	50/50
7	15.2 (50)	50/50	14.4 (50)	95	50/50	14.5 (50)	95	50/50	13.2 (50)	87	50/50
8	14.9 (50)	50/50	14.1 (50)	95	50/50	14.3 (50)	96	50/50	12.9 (50)	87	50/50
9	14.7 (50)	50/50	14.3 (50)	97	50/50	14.4 (50)	98	50/50	13.3 (50)	90	50/50
10	14.7 (50)	50/50	14.1 (50)	96	50/50	14.2 (50)	97	50/50	12.8 (50)	87	50/50
11	15.0 (50)	50/50	14.5 (50)	97	50/50	14.6 (50)	97	50/50	13.2 (50)	88	50/50
12	14.3 (50)	50/50	13.8 (50)	97	50/50	14.0 (50)	98	50/50	12.7 (50)	89	50/50
13	15.3 (50)	50/50	14.8 (50)	97	50/50	14.9 (50)	97	50/50	13.6 (50)	89	50/50
14	14.5 (50)	50/50	14.1 (50)	97	50/50	14.3 (50)	99	50/50	13.1 (50)	90	50/50
18	14.9 (50)	50/50	14.5 (50)	97	50/50	14.5 (50)	97	50/50	13.4 (50)	90	50/50
22	15.1 (50)	50/50	15.0 (50)	99	50/50	14.8 (50)	98	50/50	13.5 (50)	89	50/50
26	15.6 (50)	50/50	15.3 (50)	98	50/50	15.2 (50)	97	50/50	13.6 (50)	87	50/50
30	15.6 (50)	50/50	15.4 (50)	99	50/50	15.3 (50)	98	50/50	13.9 (50)	89	50/50
34	15.7 (50)	50/50	15.4 (50)	98	50/50	14.9 (50)	95	50/50	13.6 (50)	87	50/50
38	15.7 (50)	50/50	15.7 (50)	100	50/50	15.2 (50)	97	50/50	14.0 (50)	89	50/50
42	15.9 (50)	50/50	15.8 (50)	99	50/50	15.4 (50)	97	50/50	14.0 (50)	88	50/50
46	16.2 (50)	50/50	16.0 (50)	99	50/50	15.5 (50)	96	50/50	14.3 (50)	88	50/50
50	15.9 (50)	50/50	15.7 (50)	99	50/50	15.2 (50)	96	50/50	13.9 (50)	87	50/50
54	15.8 (50)	50/50	16.0 (50)	101	50/50	15.7 (50)	99	50/50	14.7 (50)	93	50/50
58	15.8 (50)	50/50	15.8 (50)	100	50/50	15.5 (50)	98	50/50	14.3 (50)	91	50/50
62	16.6 (50)	50/50	16.7 (50)	101	50/50	16.3 (50)	98	50/50	14.7 (50)	89	50/50
66	17.0 (50)	50/50	16.8 (49)	99	49/50	16.4 (50)	96	50/50	14.9 (50)	88	50/50
70	17.1 (50)	50/50	16.8 (49)	98	49/50	16.4 (49)	96	49/50	15.0 (50)	88	50/50
74	16.5 (50)	50/50	16.7 (49)	101	49/50	16.3 (49)	99	49/50	14.5 (50)	88	50/50
78	16.9 (49)	49/50	16.8 (49)	99	49/50	16.2 (49)	96	49/50	14.3 (50)	85	50/50
82	16.6 (48)	48/50	16.5 (49)	99	49/50	15.1 (48)	91	48/50	13.6 (49)	82	49/50
86	15.7 (48)	48/50	16.5 (48)	105	48/50	15.8 (48)	101	48/50	14.0 (48)	89	48/50
90	16.4 (47)	47/50	15.9 (48)	97	48/50	15.5 (48)	95	48/50	14.1 (48)	86	48/50
94	16.1 (46)	46/50	16.5 (46)	102	47/50	15.9 (46)	99	46/50	14.1 (47)	88	47/50
98	15.8 (44)	44/50	16.2 (45)	103	45/50	15.5 (45)	98	45/50	13.7 (47)	87	47/50
102	15.3 (42)	42/50	16.1 (42)	105	42/50	15.5 (41)	101	41/50	13.9 (46)	91	46/50
104	15.7 (39)	39/50	15.8 (41)	101	41/50	15.2 (41)	97	41/50	13.7 (46)	87	46/50

< >:No. of effective animals, ( ):No. of measurement animals Av.FC.: g

TABLE 9 FOOD CONSUMPTION CHANGES OF FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Week on Study	Control Av.Wt.	Control No. of Surviv.	750ppm Av.Wt.	750ppm % of cont.	750ppm No. of Surviv.	1500ppm Av.Wt.	1500ppm % of cont.	1500ppm No. of Surviv.	3000ppm Av.Wt.	3000ppm % of cont.	3000ppm No. of Surviv.
	<50>		<50>			<50>			<50>		
1	10.5 (50)	50/50	10.3 (50)	98	50/50	9.6 (50)	91	50/50	8.3 (50)	79	50/50
2	10.9 (50)	50/50	10.6 (50)	97	50/50	10.2 (50)	94	50/50	9.8 (50)	90	50/50
3	10.9 (50)	50/50	10.5 (50)	96	50/50	10.2 (50)	94	50/50	9.6 (50)	88	50/50
4	10.6 (50)	50/50	10.2 (50)	96	50/50	9.9 (50)	93	50/50	9.3 (50)	88	50/50
5	10.5 (50)	50/50	10.1 (50)	96	50/50	9.6 (50)	91	50/50	9.3 (50)	89	50/50
6	10.0 (50)	50/50	9.5 (50)	95	50/50	9.3 (50)	93	50/50	8.8 (50)	88	50/50
7	10.0 (50)	50/50	9.6 (50)	96	50/50	9.4 (50)	94	50/50	9.1 (50)	91	50/50
8	9.7 (50)	50/50	9.4 (50)	97	50/50	9.0 (50)	93	50/50	8.7 (50)	90	50/50
9	9.8 (50)	50/50	9.4 (50)	96	50/50	9.1 (50)	93	50/50	8.5 (50)	87	50/50
10	9.6 (50)	50/50	9.3 (40)	97	50/50	8.9 (50)	93	50/50	8.5 (50)	89	50/50
11	9.6 (50)	50/50	9.4 (50)	98	50/50	9.0 (50)	94	50/50	8.6 (50)	90	50/50
12	9.5 (50)	50/50	9.2 (50)	97	50/50	8.6 (50)	91	50/50	6.9 (50)	73	50/50
13	9.7 (50)	50/50	9.3 (50)	96	50/50	9.2 (50)	95	50/50	8.6 (50)	89	50/50
14	9.6 (50)	50/50	9.2 (50)	96	50/50	9.0 (50)	94	50/50	8.5 (50)	89	50/50
18	9.8 (50)	50/50	9.5 (50)	97	50/50	9.1 (50)	93	50/50	8.6 (50)	88	50/50
22	10.3 (50)	50/50	10.1 (50)	98	50/50	9.6 (50)	93	50/50	8.9 (50)	86	50/50
26	10.5 (50)	50/50	10.4 (50)	99	50/50	9.8 (50)	93	50/50	9.1 (50)	87	50/50
30	10.8 (50)	50/50	10.8 (50)	100	50/50	10.0 (50)	93	50/50	9.4 (50)	87	50/50
34	11.0 (50)	50/50	10.8 (50)	98	50/50	10.2 (50)	93	50/50	9.4 (50)	85	50/50
38	11.2 (50)	50/50	11.2 (50)	100	50/50	10.4 (50)	93	50/50	9.5 (50)	85	50/50
42	11.2 (50)	50/50	11.1 (50)	99	50/50	10.2 (50)	91	50/50	9.5 (50)	85	50/50
46	11.5 (50)	50/50	11.2 (50)	97	50/50	10.6 (50)	92	50/50	9.7 (50)	84	50/50
50	11.3 (50)	50/50	11.4 (50)	101	50/50	10.4 (50)	92	50/50	9.6 (50)	85	50/50
54	11.7 (50)	50/50	11.6 (50)	99	50/50	11.0 (50)	94	50/50	9.9 (50)	85	50/50
58	11.2 (50)	50/50	11.0 (50)	98	50/50	10.6 (50)	95	50/50	9.8 (50)	88	50/50
62	12.0 (50)	50/50	12.0 (50)	100	50/50	11.2 (50)	93	50/50	10.0 (50)	83	50/50
66	12.5 (50)	50/50	12.4 (50)	99	50/50	11.7 (50)	94	50/50	10.7 (50)	86	50/50
70	12.7 (50)	50/50	12.4 (50)	98	50/50	11.7 (50)	92	50/50	10.6 (50)	83	50/50
74	12.6 (50)	50/50	12.3 (50)	98	50/50	11.9 (50)	94	50/50	10.6 (49)	84	49/50
78	12.6 (50)	50/50	12.3 (50)	98	50/50	11.9 (50)	94	50/50	10.6 (47)	84	47/50
82	12.4 (50)	50/50	12.4 (49)	100	49/50	11.9 (49)	96	49/50	10.8 (46)	87	46/50
86	12.7 (50)	50/50	12.7 (48)	100	48/50	12.3 (49)	97	49/50	10.5 (44)	83	44/50
90	12.6 (50)	50/50	12.6 (47)	100	47/50	12.0 (48)	95	48/50	10.8 (44)	86	44/50
94	12.9 (47)	47/50	13.2 (46)	102	46/50	12.5 (47)	97	47/50	11.1 (43)	86	43/50
98	12.6 (44)	44/50	12.9 (44)	102	44/50	12.5 (44)	99	44/50	10.8 (43)	86	43/50
102	12.5 (40)	39/50	12.9 (42)	103	42/50	12.7 (42)	102	42/50	10.7 (40)	86	40/50
104	12.4 (38)	38/50	12.0 (41)	97	41/50	12.1 (42)	98	42/50	10.3 (39)	83	39/50

< >:No. of effective animals, ( ):No. of measurement animals Av.FC.: g

TABLE 10 NEOPLASTIC LESIONS INCIDENCE AND STATISTICAL ANALYSIS OF MALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Group Name	Control	750ppm	1500ppm	3000ppm
SITE : pituitary gland				
TUMOR : adenoma				
Tumor rate				
Overall rates(a)	17/50(34.0)	14/50(28.0)	12/50(24.0)	5/50(10.0)
Adjusted rates(b)	34.15	19.51	24.39	10.64
Terminal rates(c)	13/39(33.3)	8/41(19.5)	10/41(24.4)	4/46(8.7)
Statistical analysis				
Peto test				
Standard method(d)	P=0.9537			
Prevalence method(d)	P=0.9930			
Combined analysis (d)	P=0.9986			
Cochran-Amitage test(e)	P=0.0036**			
Fisher Exact test(e)		P=0.3335	P=0.1895	P=0.0035**
SITE : pituitary gland				
TUMOR : adenoma, adenocarcinoma				
Tumor rate				
Overall rates(a)	19/50(38.0)	15/50(30.0)	12/50(24.0)	5/50(10.0)
Adjusted rates(b)	36.59	19.51	24.39	10.64
Terminal rates(c)	14/39(35.9)	8/41(19.5)	10/41(24.4)	4/46(8.7)
Statistical analysis				
Peto test				
Standard method(d)	P=0.9813			
Prevalence method(d)	P=0.9965			
Combined analysis (d)	P=0.9997			
Cochran-Amitage test(e)	P=0.0009**			
Fisher Exact test(e)		P=0.2639	P=0.0973	P=0.0010**
SITE : thyroid				
TUMOR : C-cell adenoma				
Tumor rate				
Overall rates(a)	3/50(6.0)	6/50(12.0)	1/50(2.0)	10/50(20.0)
Adjusted rates(b)	7.69	14.63	2.44	21.74
Terminal rates(c)	3/39(7.7)	6/41(14.6)	1/41(2.4)	10/46(21.7)
Statistical analysis				
Peto test				
Standard method(d)	P=------			
Prevalence method(d)	P=0.0396*			
Combined analysis (d)	P=------			
Cochran-Amitage test(e)	P=0.0383*			
Fisher Exact test(e)		P=0.2436	P=0.3086	P=0.0357*

(a):Number of tumor-bearing animals/number of animals examined at the site.
(b):Kaplan-Meire estimate tumor incidence at the end of the study after adjusting for intercurrent mortality.
(c):Observed tumor incidence at terminal kill.
(d):Beneath the control incidence are the P-values associated with the trend test.
Standard method :Death analysis
Prevalence method :Incidental tumor test
Combined analysis :Death analysis + Incidental tumor test
(e):The Cochran-Armitage and Fisher exact test compare directly the overall incidence rates.
?: The conditional probabities of the largest and smallest possible out comes can not be estimated or this P-value is beyond the estimated P-value.
------:There is no data which should be statistical analysis.
Significant difference;*:P≦0.05 **:P≦0.01

TABLE 11 NEOPLASTIC LESIONS INCIDENCE AND STATISTICAL ANALYSIS OF FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Group Name	Control	750ppm	1500ppm	3000ppm
SITE : adrenal gland				
TUMOR : pheochromocytoma				
Tumor rate				
Overall rates(a)	4/50(8.0)	2/50(4.0)	1/50(2.0)	0/50(0.0)
Adjusted rates(b)	9.30	4.88	2.38	0.0
Terminal rates(c)	3/38(7.9)	2/41(4.9)	1/42(2.4)	0/39(0.0)
Statistical analysis				
Peto test				
Standard method(d)	P=------			
Prevalence method(d)	P=0.9890			
Combined analysis (d)	P=------			
Cochran-Amitage test(e)	P=0.0319*			
Fisher Exact test(e)		P=0.3389	P=0.1811	P=0.0587
SITE : adrenal gland				
TUMOR : pheochromocytoma, pheochromocytoma:malignant				
Tumor rate				
Overall rates(a)	5/50(10.0)	2/50(4.0)	1/50(2.0)	0/50(0.0)
Adjusted rates(b)	11.63	4.88	2.38	0.0
Terminal rates(c)	4/38(10.5)	2/41(4.9)	1/42(2.4)	0/39(0.0)
Statistical analysis				
Peto test				
Standard method(d)	P=------			
Prevalence method(d)	P=0.9960			
Combined analysis (d)	P=------			
Cochran-Amitage test(e)	P=0.0147*			
Fisher Exact test(e)		P=0.2181	P=0.1022	P=0.0281*
SITE : uterus				
TUMOR : endometrial stromal polyp				
Tumor rate				
Overall rates(a)	8/50(16.0)	12/50(24.0)	9/50(18.0)	15/50(30.0)
Adjusted rates(b)	16.67	24.00	16.67	32.50
Terminal rates(c)	5/38(13.2)	8/41(19.5)	7/42(16.7)	12/39(30.8)
Statistical analysis				
Peto test				
Standard method(d)	P=0.6513			
Prevalence method(d)	P=0.0391*			
Combined analysis (d)	P=0.0599			
Cochran-Amitage test(e)	P=0.1335			
Fisher Exact test(e)		P=0.2273	P=0.4995	P=0.0767
SITE : uterus				
TUMOR : endometrial stromal sarcoma				
Tumor rate				
Overall rates(a)	1/50(2.0)	4/50(8.0)	0/50(0.0)	1/50(2.0)
Adjusted rates(b)	0.0	4.88	0.0	2.56
Terminal rates(c)	0/38(0.0)	2/41(4.9)	0/42(0.0)	1/39(2.6)
Statistical analysis				
Peto test				
Standard method(d)	P=0.8913			
Prevalence method(d)	P=0.3754			
Combined analysis (d)	P=0.7372			
Cochran-Amitage test(e)	P=0.4835			
Fisher Exact test(e)		P=0.1811	P=0.4999	P=0.2475

TABLE 11 NEOPLASTIC LESIONS INCIDENCE AND STATISTICAL ANALYSIS OF FEMALE RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL(CONTINUED)

Group Name	Control	750ppm	1500ppm	3000ppm
SITE : mammary gland				
TUMOR : adenocarcinoma				
Tumor rate				
Overall rates(a)	3/50(6.0)	4/50(8.0)	0/50(0.0)	0/50(0.0)
Adjusted rates(b)	5.00	9.76	0.0	0.0
Terminal rates(c)	1/38(2.6)	4/41(9.8)	0/42(0.0)	0/39(0.0)
Statistical analysis				
Peto test				
Standard method(d)	P=0.9201 ?			
Prevalence method(d)	P=0.9747			
Combined analysis (d)	P=0.9904			
Cochran-Amitage test(e)	P=0.0319*			
Fisher Exact test(e)		P=0.4998	P=0.1212	P=0.1212

(a):Number of tumor-bearing animals/number of animals examined at the site.
(b):Kaplan-Meire estimate tumor incidence at the end of the study after adjusting for intercurrent mortality.
(c):Observed tumor incidence at terminal kill.
(d):Beneath the control incidence are the P-values associated with the trend test.
Standard method :Death analysis
Prevalence method :Incidental tumor test
Combined analysis :Death analysis + Incidental tumor test
(e):The Cochran-Armitage and Fisher exact test compare directly the overall incidence rates.
?: The conditional probabities of the largest and smallest possible out comes can not be estimated or this P-value is beyond the estimated P-value.
------:There is no data which should be statistical analysis.
Significant difference;*:P≦0.05 **:P≦0.01

TABLE 12 NUMBER OF RATS WITH SELECTED NON-NEOPLASTIC LESIONS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

Group name		Male				Female			
		Control	750ppm	1500ppm	3000ppm	Control	750ppm	1500ppm	3000ppm
		<50> (39)	<50> (41)	<50> (41)	<50> (46)	<50> (38)	<50> (41)	<50> (42)	<50> (39)
Nasal cavity		11 (9)	1** (1)*	1** (1)*	8 (8)	3 (2)	14** (13)**	13* (13)**	8 (8)
eosinophilic change	+	11 (9)	1 (1)	1 (1)	8 (8)	3 (2)	14 (13)	13 (13)	8 (8)
:respiratory epithelium	2+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
eosinophilic change		45 (37)	42 (37)	42 (38)	44 (43)	46 (37)	46 (40)	49 (42)	46** (39)**
:olfactory epithelium	+	44 (36)	40 (35)	41 (37)	43 (42)	44 (35)	45 (39)	45 (38)	29 (22)
	2+	1 (1)	2 (2)	1 (1)	1 (1)	2 (2)	1 (1)	4 (4)	17 (17)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lung		0 (0)	1 (1)	4 (4)	3 (3)	2 (2)	3 (3)	5 (5)	15** (14)**
accumulation of foamy cells	+	0 (0)	1 (1)	4 (4)	3 (3)	2 (2)	3 (3)	5 (5)	14 (13)
	2+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Kidney		48 (39)	50 (41)	50** (41)**	48** (46)**	44 (36)	46 (40)	41 (35)	30** (27)**
chronic nephropathy	+	0 (0)	1 (1)	0 (0)	5 (5)	15 (12)	13 (11)	14 (13)	20 (18)
	2+	14 (11)	19 (16)	33 (25)	38 (36)	22 (20)	28 (26)	25 (20)	10 (9)
	3+	31 (26)	22 (17)	17 (16)	5 (5)	4 (3)	3 (2)	2 (2)	0 (0)
	4+	3 (2)	8 (7)	0 (0)	0 (0)	3 (1)	2 (1)	0 (0)	0 (0)
papillary necrosis		0 (0)	1 (1)	9** (8)*	24** (21)**	0 (0)	4 (4)	31** (26)**	47** (36)**
	+	0 (0)	1 (1)	9 (8)	23 (20)	0 (0)	4 (4)	13 (10)	10 (7)
	2+	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	18 (16)	35 (28)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Grade +:Slight 2+:Moderate 3+:Marked 4+:Severe
< >:Number of animals examined at the site
( ):Sacrificed animals

TABLE 12 NUMBER OF RATS WITH SELECTED NON-NEOPLASTIC LESIONS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL(Continued)

Group name		Male				Female			
		Control	750ppm	1500ppm	3000ppm	Control	750ppm	1500ppm	3000ppm
		<50> (40)	<50> (40)	<50> (40)	<50> (40)	<50> (40)	<50> (40)	<50> (40)	<50> (40)
deposit of crystal		0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	17** (14)**
	+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	14 (12)
	2+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (2)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
mineralization		0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6* (5)	19** (13)**
:papillary	+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6 (5)	19 (13)
	2+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
urothelial hyperplasia		0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	2 (2)	34** (28)**
:pelivis	+	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	2 (2)	24 (20)
	2+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9 (8)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
eosinophilic droplet		0 (0)	0 (0)	0 (0)	0 (0)	13 (11)	18 (14)	26* (25)*	23* (21)*
:proximal tubule	+	0 (0)	0 (0)	0 (0)	0 (0)	11 (9)	14 (12)	24 (23)	23 (21)
	2+	0 (0)	0 (0)	0 (0)	0 (0)	2 (2)	4 (2)	2 (2)	0 (0)
	3+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	4+	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Grade +:Slight 2+:Moderate 3+:Marked 4+:Severe
< >:Number of animals examined at the site
( ):Sacrificed animals

TABLE 13 CAUSE OF DEATH OF RATS IN THE 2-YEAR DRINKING WATER STUDY OF GLYOXAL

		Male				Female			
Group		Control	750ppm	1500ppm	3000ppm	Control	750ppm	1500ppm	3000ppm
Number of dead or moribund animals		11	9	9	4	12	9	8	11
No microscopical confirmation		0	0	1	0	0	0	0	1
endocrine system lesion		0	0	0	1	0	0	0	0
Cardiovascular lesion		0	0	0	0	0	1	0	2
Renal lesion		0	0	0	0	0	0	0	1
Chronic nephropathy		0	0	0	0	1	0	0	0
Tumor death	leukemia	3	0	1	0	4	2	2	2
	subcutis	2	1	3	0	0	0	0	2
	lung	0	0	0	1	0	0	0	0
	heart	1	0	0	0	0	0	0	0
	pituitary	3	7	2	0	3	4	3	2
	pancreas islet	0	0	0	1	0	0	0	0
	thyroid	0	0	0	0	0	0	0	1
	uterus	0	0	0	0	2	2	2	0
	adrenal	1	1	0	1	0	0	0	0
	mammary gland	0	0	0	0	1	0	0	0
	preputial/clitoral gland	1	0	0	0	0	0	0	0
	brain	0	0	1	0	1	0	1	0
	Zymbal gland	0	0	1	0	0	0	0	0