

J C Pettersen¹, D R Saunders², K L Pavkov¹, D W Matheson¹, and D R Schwartz¹

Ciba-Geigy Corp., Plant Protection Division, Farmington, CT¹; Greensboro, NC²

ABSTRACT

CD rats (Charles River) are outbred rats, derived from Sprague Dawley rats, and are commonly used in toxicological research. Over the past two decades, survival rates have decreased in control CD rats in 2-year chronic toxicity/oncogenicity studies. These changes have been attributed to an inherent increase in weight gain and obesity. This study compares various toxicological end points in the CD and SD (Harlan) rats. Sixty rats/stock/sex were singly housed in polycarbonate cages containing hardwood bedding at 19-24°C and in a 12-hour light/dark cycle. They received Purina Certified Rodent Chow #5002 ground meal and tap water *ad libitum*. At 12 months, 10 rats/stock/sex were terminated for interim evaluation. At the end of 24 months, survival rates were 29/44 and 49/63 percent for males/females in the respective CD and SD stocks. At 3, 12 and 24 months, respective body weights of the males/females CD rats were 30/27, 38/52 and 48/59 percent greater than those of the SD rats. Corresponding weekly food consumption values were 30/21, 26/35 and 26/9 percent greater in the CD rats. We believe the better survival, smaller size and lower food consumption of the SD rat may make it a better model for long-term chronic toxicity/oncogenicity studies.

INTRODUCTION

The Charles River CrI:CD[®]BR (abbreviated as CD) rat is an outbred stock derived from Sprague-Dawley rats over 40 years ago. The CD rat is probably the most widely used strain of rats in the United States for toxicology testing. Over the past two decades, survival rates have decreased in control CD rats in two-year chronic toxicity/oncogenicity studies. These changes have been attributed to an inherent increase in weight gain and obesity.

The Hsd:Sprague Dawley[®]SD[™] rat (abbreviated as SD) is an outbred stock originated in 1925. It is maintained by Harlan Sprague Dawley, Inc.

OBJECTIVES

To obtain comparative data on survival, weight gain, food consumption, clinical laboratory parameters, organ weight, necropsy and histopathology findings for the CD and SD rat.

STUDY DESIGN

- Initiation: 60 rats/sex/stock
- 12 month sacrifice: 10 rats/sex/stock
- Remaining 50 rats/sex/stock allocated for the full 24 months of the study

MATERIALS AND METHODS

• Animals

CrI:CD[®]BR (4 weeks old on receipt) obtained from Charles River Laboratories, Raleigh, NC

Hsd:Sprague Dawley[®]SD[™] (4 weeks old on receipt) obtained from Harlan Sprague Dawley, Frederick, MD.

• Animal Housing and Maintenance

Two week quarantine

Housed individually in suspended polycarbonate cages (19 x 21 x 20 cm) with hardwood chips for bedding

Purina Certified Rodent Chow #5002 ground meal diet and tap water supplied *ad libitum*

15 air changes per hour
Temperature 19-24°C
Relative humidity 40-60%
12 hour dark-light cycle

MATERIALS AND METHODS

In-Life Procedures

• Clinical Observations

Observed twice daily for mortality
General physical examinations weekly

• Body Weight and Food Consumption

Weekly for the first 13 weeks and every 4 weeks thereafter

• Ophthalmoscopic Examinations: Pretest, 12 and 24 months

• Clinical Laboratory Tests

Hematology: 20 rats/sex/group at 3, 6, 12 and 24 months

Clinical Chemistry: 10 rats/sex/group at 6, 12, 18 and 24 months

Urinalysis: 10 rats/sex/group at 3, 6, 12, 18 and 24 months

A COMPARISON STUDY OF THE CrI:CD®BR (CD) AND Hsd:Sprague Dawley®SD™ (SD) RAT

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MATERIALS AND METHODS

Terminal Procedures

- Organ Weights
- Necropsy: Unscheduled and scheduled (12 and 24 months) deaths
- Histopathology: all collected tissues

BODY WEIGHT (GRAMS) AND FOOD CONSUMPTION (GRAMS/DAY)

Interval	Body Weight			Food Consumption		
	CD	SD	% Increase (CD/SD)	CD	SD	% Increase (CD/SD)
Males						
13 Weeks	674	443	30	26.9	20.6	30
52 Weeks	798	578	38	26.2	20.8	26
104 Weeks	824	558	48	24.0	19.1	26
Females						
13 Weeks	321	252	27	18.0	14.9	21
52 Weeks	472	311	52	19.8	14.7	35
104 Weeks	547	344	59	16.0	14.7	9

TABLE 1
ANIMALS WITH ONE OR MORE CLINICALLY PALPABLE MASSES

Number of Masses	Males		Females	
	CD	SD	CD	SD
1	15	14	12	29
2	9	10	10	13
3	7	2	15	4
4	0	0	6	0
5	0	0	4	0
6	0	0	3	1
Total No. of Animals with Masses	31	26	50	47

RESULTS/CONCLUSIONS

- At the end of 24 months, survival rates were 29/44 and 49/63 percent for males/females in the respective CD and SD stocks (Figures 1 and 2).
- The number of animals exhibiting palpable masses was similar in the CD and SD stocks (Table 1).
- At 3, 12 and 24 months, respective body weights of the males/females CD rats were 30/27, 38/52 and 48/59 percent greater than those of the SD rats (Figures 3 and 4).
- Corresponding weekly food consumption values were 30/21, 26/35 and 26/9 percent greater in the CD rats (Figures 5 and 6).
- We believe the better survival, smaller size and lower food consumption of the SD rat may make it a better model for long-term chronic toxicity/oncogenicity studies.

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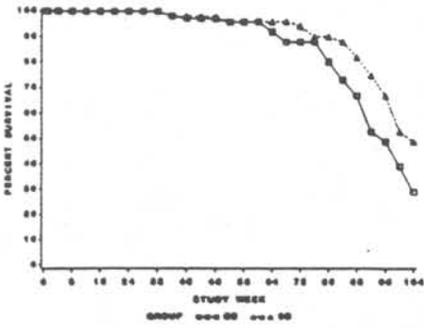


Figure 1 Mean Weekly Survival - Males

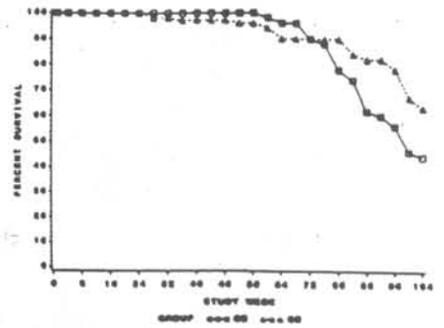


Figure 2 Mean Weekly Survival - Females

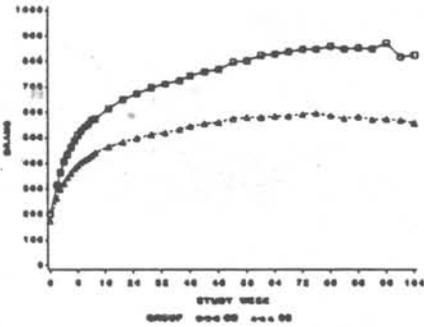


Figure 3 Mean Weekly Body Weights - Males

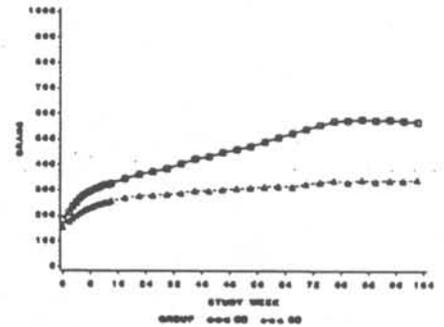


Figure 4 Mean Weekly Body Weights - Females

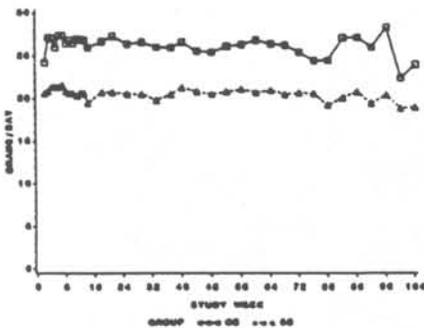


Figure 5 Mean Weekly Food Consumption - Males

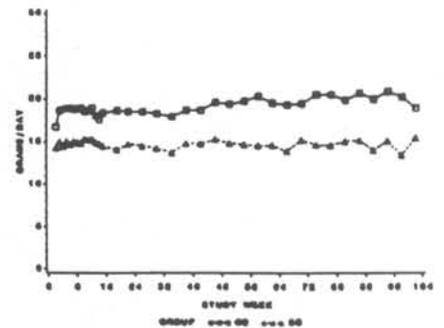


Figure 6 Mean Weekly Food Consumption - Females