Comparisons of Historical Control Clinical Pathology Data from Sprague Dawley Rats and Wistar Han Rats of Similar Ages

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1 ABSTRACT

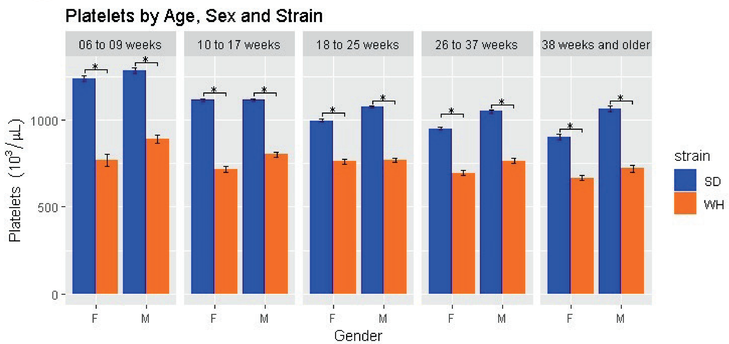
Sprague Dawley (SD) rats have been traditionally used in toxicology studies; however, the use of Wistar Han (WH) rats in toxicology studies is increasing due to their smaller size and increased longevity. Historical control data may be used to aid interpretation of clinical pathology effects noted during toxicology studies, particularly in the absence of control groups, or to identify vehicle effects or outlier data. Selecting an appropriate historical control data set is important due to differences in rat strain, sex, collection site and age. Clinical pathology historical control data from SD and WH rats of varying ages and collection sites were generated and compared. Hematology, coagulation, clinical chemistry and urinalysis data were collected over a four to six-year period from SD and WH control rats. Following appropriate statistical analysis and review, tables were generated based on strain (SD or WH), sex, age (6 to 9 weeks old, 10 to 17 weeks old, 18 to 25 weeks old, 26 to 37 weeks old, and 38 weeks and older) and site of collection (sublingual or vena cava). Overall, WH rats had lower total leukocyte, neutrophil, lymphocyte and platelet counts in both sexes across all ages and sites of collection; lower cholesterol concentrations in females across all ages and sites of collection; lower alkaline phosphatase activity in both sexes up to 17 weeks old; and lower urine volume in both sexes aged 38 weeks or older. All other differences identified in the data were either minimal or sporadic, and of no biologic significance.

2 MATERIALS AND METHODS

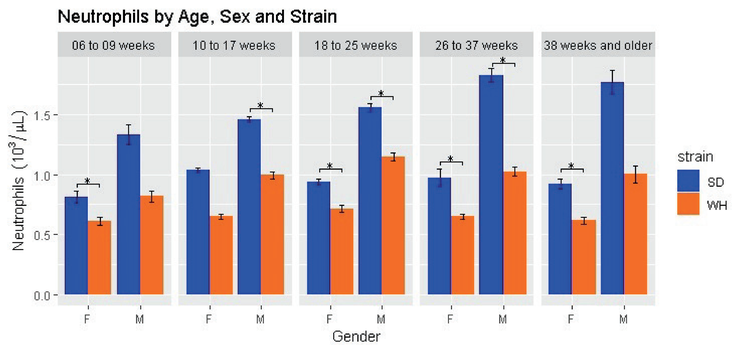
Historical control data from approximately the last 5 years was correlated and effects on selected clinical pathology parameters (leukocytes, neutrophils, lymphocytes, platelet counts, cholesterol concentrations, alkaline phosphatase activity, and urine volume) were evaluated.

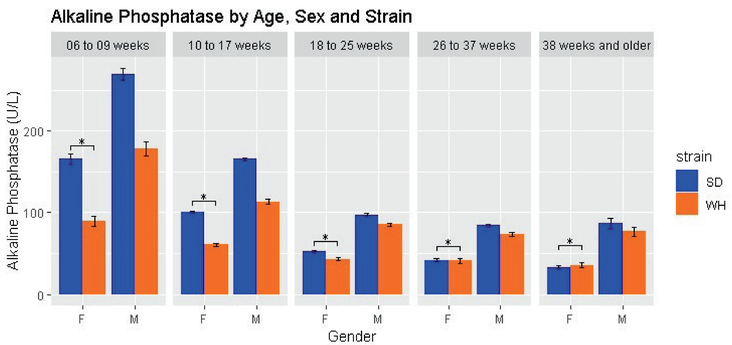
The raw data was tabulated by collection time interval. Appropriate summary statistics were calculated for each endpoint, by strain, sex, and age intervals. Multiple linear regression and ANOVA were performed to determine the effect of strain, sex, age groups, on the endpoints. Each model included the individual factors and possible two-way and three-way interactions: strain, sex, and age groups. The criteria for inclusion of a factor in the final model, for each endpoint, was $p \leq 0.05$.

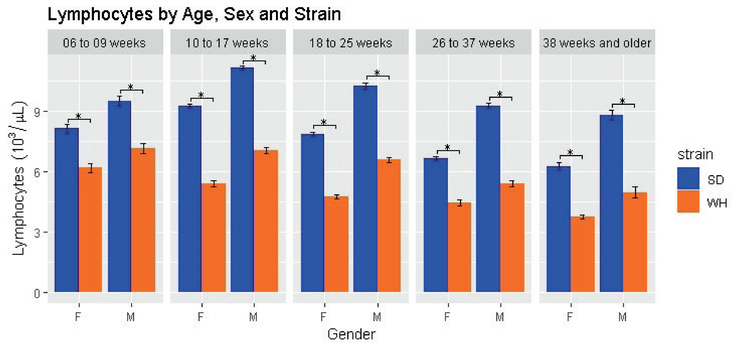
3 RESULTS

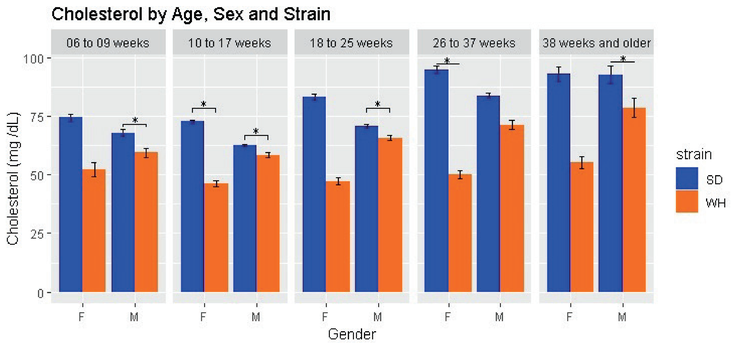


In platelets, results show significant differences (p < 0.05; *) between Wistar Han and Sprague Dawley for each sex, and each age group.









In neutrophils, the results did not show significant differences (p > 0.05) between Wistar Han and Sprague Dawley for females in each age group (10 to 17 weeks was not significant) and males in each age group (6 to 9 weeks and 38 weeks and older were not significant).

In lymphocytes, results show significant differences (p < 0.05) between Wistar Han and Sprague Dawley for each sex, and each age group.

For alkaline phosphatase, results show significant differences (p < 0.05) between Wistar Han and Sprague Dawley for females, at each age group. However, in males, alkaline phosphatase results did not show significant differences.

For cholesterol, the results did not show significant differences (p > 0.05) between Wistar Han and Sprague Dawley for females in each age group (6 to 9 weeks, 18 to 25 weeks, and 38 weeks and older were not significant) and males in each age group (except 26 to 37 weeks).

4 CONCLUSIONS

- Review of historical control data shows significant differences in select hematology and clinical chemistry parameters between Sprague Dawley and Wistar Han rats.
- Because differences are known to occur between strains, it is important to maintain current historical control data between strains and routinely evaluate the differences.

5 ACKNOWLEDGEMENTS

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