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Bio-Serv's Rodent Medicated Dosing Systems (Rodent MD's™); a low-stress dosing alternative for rodents during the post-operative period

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Minimizing stress in rodents is not only good for animal welfare, but also for better science (Fig. 1). Rodents can experience stress during the post-operative period as a result of anxiety and fear, direct handling by humans, unrelieved pain and conventional dosing methods. This additional stress can change physiologic function by altering metabolic rate, immune response and post-operative recovery. Minimizing dosing stress can be a significant approach to reducing physiologic stress and hastening post-op recovery.

Studies have documented injection stress in mice by measuring core body temperature changes. A sensitive measure of monitoring those changes is by studying mice that have been instrumented with radiotelemetry intraperitoneal (IP) probes. Instrumented mice were given an IP injection of a non-steroidal anti-inflammatory (NSAID) and it induced hypothermia for hours. No hypothermia was noted when the NSAID was given orally via voluntary oral consumption in a treat¹.

Stress-free oral dosing for rodents is achieved by using Bio-Serv's Rodent Medicated Dosing System MD's Tablets (Rodent MD's). Rodent MD's provide a precise, flexible dosing system and can be customized in several different flavors, sizes, drug dosages, and drug combinations. Our standard Rodent MD's are a grain-based, nutritionally complete, highly palatable bacon-flavored formula, which provides a sole-source medicated diet or a nutritious supplement depending on protocol requirements (Fig. 2). The combination of the grain-base and the bacon flavor offer superior taste masking quality, which make the medicated tablets readily acceptable to the rodents.

Rodent MD's are manufactured in a cold-compression process that involves neither heat nor steam, which spares the drug or compound from potential degradation during the tableting process. The powdered base is thoroughly mixed with the medication or experimental drug and compressed into tablets. Rodent MD's are scored for easy dosing options.

There are additional advantages to minimizing dosing stress that Rodent MD's offer. Since Rodent MD's are highly palatable, they will stimulate a rodent's appetite in a post-operative condition, therefore reducing metabolic setbacks and accelerating recovery. They reduce risk of dehydration as mixing medications into water can be extremely problematic when rodents refuse to consume



FIGURE 1 Minimizing stress in rodents is not only good for animal welfare, but also for better science.

the off-taste of medicated water or if they are unable to ambulate post-op and cannot reach the water sipper. Additionally, by providing Rodent MD's at cage level, this will promote normal foraging behavior and rodents can be evaluated on their recovery status by monitoring their ambulation and food intake. Rodent MD's provide a round the clock dosage treatment regime as they randomly consume the medicated food tablet. Unpublished PK validation studies have found there is a more steady state blood level using Rodent MD's versus peak and trough fluctuations seen with routine gavage or parenteral dosing.

A few husbandry tips should be considered when using Rodent MD's. Rodents can be neophobic and the Rodent MD's should be introduced using the placebo MD's or as a form of pre-treatment with the medicated MD's 1–2 days before surgery to acclimate the animals while they are feeling normal so they do not associate the introduction of a novel food item negatively. Once briefly acclimated, the vast majority of rats and mice will preferentially consume the Rodent MD's over their regular diet. That leads to the discussion of how to gauge dosing mice versus rats. The average mouse consumes 5 grams of diet/mouse/day. The Rodent MD's are a 5

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FIGURE 2 | Our standard Rodent MD's are a grain-based, nutritionally complete, highly palatable bacon-flavored formula, which provides a sole-source medicated diet or a nutritious supplement depending on protocol requirements.

gram size tablet which meets a mouse's daily nutritional and medicated needs and therefore mice do not need to be supplemented with their regular diet. However for ease, the diet can be left in the cage as the mouse will selectively choose the bacon-flavored Rodent MD's over their normal diet. In the case of rats, they consume an average of 15 grams/rat/day so the 5 gram size tablet is a nutritional supplement and since they will selectively consume the Rodent MD's tablet, there is no need to remove their regular diet from the food hopper.

Bio-Serv's Rodent MD's are identified by product name for either rats or mice Rat MD's or Mouse MD's. Because of the size variance of rats and mice, we offer different tablet concentrations to meet daily medication requirements for both species. One exception to this is Rodent Rimadyl MD's (2 mg/Tablet), which can be used for both mice and rats. The tablet is scored so a ¼ tablet per mouse/day will offer an efficacious daily dose and a whole tablet offers an efficacious

daily dose for rats. The other exception is SCID MD's, which has been primarily used to prevent *Pneumocystis carinii* in nude mice and was named many years ago before the MD line was expanded. Currently, Bio-Serv offers the following Rodent MD's including; Baytril, Rimadyl, Baytril/Rimadyl Combo, Meloxicam, Trimethoprim/Sulfamethoxazole (SCIDS), and Amoxicillin, Metronidazole, Omeprazole, Clarithromycin (Helicobacter). We have customized many other medications and drug combinations thus providing researchers the maximum dosing flexibility for their animals.

The Guide speaks to pre-surgical planning and post-operative care. Reducing stress and providing proper post-operative support will improve research outcomes². Bio-Serv Rodent MD's are a safe, stress-free, convenient and economical method of administering medications to rodent species in the post-operative condition, furthering animal welfare.

Company profile

At Bio-Serv, we help our customers achieve their research goals and provide solutions to challenges as they arise when working with laboratory animals. Our well-trained Professional Staff including a PhD Nutritionist, Veterinarian and National Sales Manager are available and prepared to help you develop a non-stressful treatment plan for your laboratory animal species. For more information on Rodent MD's Tablets or any other Bio-Serv products, please visit our website at bio-serv.com or contact us at 800-996-9908.

1. Blaha, M and Leon, L. *J. Am. Assoc. Lab. Anim. Sci.* **47**, 8–19 (2008).
2. Institute for Laboratory Animal Research. *Guide for the Care and Use of Laboratory Animals* 8th edn. (National Academies Press, Washington, DC, 2011).

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