

University Animal Care Committee Standard Operating Procedure		
Document No: 10.18	Subject: Chronic DSS Colitis (Rat Model)	
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Location: Queen's University

Responsibility: Principal Investigators, Research Staff, Veterinary Staff

Purpose: The purpose of this Standard Operating Procedure (SOP) is to describe generating a chronic colitis model of intestinal inflammation using Dextran Sodium Sulphate (DSS).

1. Introduction and Definitions: Dextran sodium sulfate (DSS) is a molecule that induces colitis like that seen in human patients. It is administered to the animal via their drinking water. This is a common model of Inflammatory Bowel Disease (IBD), a condition of chronic intestinal inflammation that is currently incurable.

Optimal DSS concentrations are determined by preliminary experiments, as disease severity often varies dependent on animal age, gender, and strain. Standard drinking water is given to controls.

Abbreviations: Animal Care Services **ACS**, Principal Investigator **PI**, subcutaneous **SC**, intravenous **IV**, intraperitoneal **IP**, intramuscular **IM**, per os **PO**, per rectum **PR**

2. Materials:

- Water bottle
- DSS solution
- Lactated Ringer's solution
- 5-10ml sterile syringes
- Sterile needles (26-27g)
- Alcohol swabs
- Weigh scale

3. Procedures:

- Prior to the initiation of a DSS cycle, all the study rats must be weighed to obtain a baseline weight and it is recorded with the date on the cage card. Based on the baseline weight, the 5%, 10% and 15% weight loss values are calculated.
 - DSS is dissolved into standard drinking water to yield the desired
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concentration (1% - 2%) ("%" = g/100 mL).

- Regular water bottles are removed from the cage and replaced with the DSS-dosed bottles.
- DSS is administered in drinking water for 5 days, followed by a return to regular water for 5 days. This cycle is repeated 3 times.
- Non-standard water bottles are used for the DSS rats, a special request is required and must be submitted to ACS.

Monitoring:

- Ensure that cages are flagged with specific ACS cage alerts that animals are on a DSS study.
- Daily monitoring: cages are checked for DSS-water consumption (volume drop in bottle, urine output) and bottles topped up/cages replaced as necessary.
- Daily weight, appearance, and behavioural changes must be recorded at room level.
- In the first two (more severe) DSS cycles: All rats in a DSS-treated group must receive a daily subcutaneous injection of 5ml lactated Ringer's solution. Each and every animal requires a new sterile syringe and needle. Refer to SOP 10.9.1 "Subcutaneous Injection Techniques in Rats". Rats must be weighed before fluid therapy administration.
- In the third DSS cycle, when clinical symptoms are expected to be less severe, only rats failing to gain weight over a 24-hour period must receive the subcutaneous injections of 5ml lactated Ringer's solution.
- Rats may receive 2 daily injections of 5ml lactated Ringer's solution on the advice of Animal Care Services (ACS) or Veterinary staff.

Clinical Outcomes:

- Treated rats may develop loose stool or diarrhea with detectable blood in the stool.
 - Rats show ruffled fur and weight loss while the colitis is present. This should begin to resolve by the third DSS cycle.
 - Weight loss should not reach a 15% drop from baseline value, unless approved in the Animal Use Protocol.
 - All humane endpoints as approved in the Animal Use Protocol must be followed.
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SOP Revision History:

Date	New Version
April 27 th , 2018	Updated
February 25 th , 2021	Triennial Update
October 17 th , 2023	Triennial Update and Format Change