Continuous intravenous (IV) infusion is a challenging role of administration on developmental and reproductive studies in the rat. Duration varies from 12 days on embryofetal development studies to up to 5 weeks on male fertility studies. Traditional concept infusion systems include subcutaneously externalized femoral vein catheters with tees secured to jackets that require frequent adjustments during the study. Additional measures taken to protect catheters from damage include the use of stainless-steel mesh reinforced pouches during catheterization as well as restriction of cohabitation to when young lights are on instead of the traditional method of overnight cohabitation. A pilot study was conducted to evaluate the feasibility of using femoral vein catheters and transcutaneous buttons with magnetic connections, including vendor-specific magnetic tees with aluminum sleeves. Twelve male and 12 female rats, surgically implanted by the vendor with femoral vein catheters bonded to transcutaneous buttons in the scapular area, were procured. Ten males were dosed with 0.1% vehicle saline via continuous IV infusion at a rate of 2 mL/kg/day for 28 days prior to mating and continuing during mating (to naïve untreated females) and the day prior to euthanasia (total of 64 days). Ten females were similarly dosed for 14 days prior to mating and continuing during mating (to naïve untreated males) and gestation until lactation day 20. Clinical observations, body weights, food consumption, clinical signs, reproductive performance, parturition, litter viability and survival, and macroscopic findings were evaluated in addition to catheter placement, patency, and dose syringe weights. Clinical observations included mild irritation at the extermination site that was transient and did not impact overall animal health. In general, all animals gained weight during the study. Maternal and paternal endpoints, including reproductive performance, were unaffected and within the range of laboratory historical control data. In addition, no remarkable findings were noted for F1 offspring. All catheters were patent at study termination and the use of transcutaneous buttons with magnetic connections proved successful in this study. The technique provided an improvement in animal welfare and study efficiency as it eliminated the use of jackets and the system updates significantly reduced the need for infusion system repairs during the course of the study.

### MATERIALS AND METHODS
- 12 adult CD (SD) rats and 12 adult female rats (Charles River Laboratories, Raleigh, NC), surgically implanted by supplier with femoral vein catheters bonded to transcutaneous buttons in the scapular area.
- Animals were single housed, identified by microchip and maintained under standard environmental/food/water conditions.
- Transcutaneous button was equipped with a magnetic tee connection (lines of traditional tees secured with jackets).
- Vendor-provided magnetic tees with aluminum sleeves (Figure 1) were designed to protect the plastic portion of the connectors from chewing during co-housing during the breeding period.
- Dosage Regimen: Continuous intravenous infusion (0.1% sodium chloride for injection, 2 mL/kg/day). Males – 28 days prior to mating and continuing during mating (to naïve untreated females) until the day prior to euthanasia (total of 64 days).
- Females – 14 days prior to mating and continuing during mating (to naïve untreated males) and gestation until Lactation Day 20.
- Endpoints evaluated: Clinical observations, body weights, food consumption, overt toxicity, reproductive performance, parturition, litter viability and survival, and macroscopic findings. Catheter placement, patency, and dose syringe weights were also collected.

### RESULTS
- All males survived to scheduled necropsy.
- All males were successfully dosed for the duration of the study.
- With the exception of 3 females, all females were successfully dosed for the duration of the study.
- One male was found dead prior to mating; the cause of death was undetermined. Its catheter was in place at necropsy.
- One female was found dead on Gestation Day 18 during a system repair; a thrombus was the suspected cause of death. Its catheter was in place at necropsy.
- One female had total litter loss on Lactation Day 2. This female was noted with impaired use of hindlimbs prior to euthanasia. Its catheter tip was not found in place at necropsy and was suspected to be the cause of the impairment.
- During the mating period, the modified tees with aluminum sleeves allowed the animals to be paired overnight with no damage to the tees.
- Clinical observations included transient mild irritation at the extermination site with no impact on animal health.
- All F2 animals gained weight during the study. Maternal and paternal endpoints, including reproductive performance, were unaffected and within the range of laboratory historical control data. All catheters were patent at study termination.
- In the F2 offspring, no remarkable findings were noted. The presence of the litter had no impact on dam influence system integrity.

### CONCLUSION
- This use of transcutaneous buttons and modified magnetic tees improved animal welfare by eliminating the use of jackets (and subsequent jacket induced irritation) traditionally used for animals with surgically implanted catheters.
- The prototype tee with protective aluminum sleeve served as an improvement over stainless-steel mesh reinforced jackets during cohabitation.
- Traditional overnight breeding was feasible with the approach, which eliminated the additional labor requirements for daily separation and repairing of males and females during the mating period.
- The reduction of infusor system repairs and the elimination of jacket adjustments during the course of the study greatly improved efficiency.
- All catheters were patent at study termination and the use of transcutaneous buttons with modified magnetic tees proved successful in this study and were an improvement over jacketed mating and nursing.