JAALAS 53 (1) January 2014 74-80

“Paradoxical Increase in Bispectral Index during Deep Anesthesia in New Zealand White Rabbits”

- Bispectral Index (BIS) is an algorithm derived from complex statistical analysis of the EEG to monitor and record of electrical activity of the brain (0- complete cortical silence, 100- awake and alert)
- Can be used to determine surgical planes of anesthesia

![BIS monitor screenshot](image)

- BIS monitor screenshot (gray arrow- euthanasia/ terminal point)
- Not reliable in rabbits due to weak EEG signals, interference of heart, and drug-induced EEG silence

JAALAS 53 (2) March 2014 204-207

“Multiple Extrauterine Pregnancy with Early and Near Full-Term Mummified Fetuses in a New Zealand White Rabbit (*Oryctolagus cuniculus*)”
- Lithopedia- mummified, calcified fetuses
- Above picture represents lithopedia in an extrauterine pregnancy of a rabbit

JAALAS 53 (3) May 2014 283-289

“Comparative Pharmodynamics of Pancuronium, Cisatracurium, and CW002 in Rabbits”

- CW002 is a potent neuromuscular blocking agent that can be reversed by injection of exogenous L-cysteine, thereby avoiding potential side effects of cholinesterase inhibitors (reversal agent)

JAALAS 53(4) July 2014 399-403

“Effects of Repeated Oral Administration of Pazufloxacin Mesylate and Meloxicam on the Antioxidant Status in Rabbits”

- Both pazufloxacin (a fluoroquinolone antimicrobial) and meloxicam (NSAID) as single agents and in combination, produced significant lipid peroxidation compared with levels in untreated controls (induce oxidative damage)
“Effects of Dexmedetomidine and Ketamine-Dexmedetomidine with and without Buprenorphine on Corticoadrenal Function in Rabbits”

- Dexmedetomidine reduces glucocorticoid secretion in rabbits
- Dexmedetomidine- ketamine combination increases cortisol and corticosterone levels as well as heart and respiratory rates
- Dexmedetomidine- ketamine- buprenorphine reduces serum glucocorticoid levels
- Premedication with buprenorphine significantly prolonged time of anesthesia induced by ketamine-dexmedetomidine
- DRUG CLASSES? Dexmedetomidine (alpha 2 adrenergic agonist) Buprenorphine (opioid partial agonist-antagonist) Ketamine (NMDA Receptor Antagonist, Dissociative agent)

“Evaluation of Lacrimation Characteristics in Clinically Normal New Zealand White Rabbits by Using Schirmer Tear Test I”

- Rabbits are a common model in eye research (KCS) and in safety testing of novel chemical agents
- Ocular disease in rabbits typically presents as an overproduction of tears due to ocular foreign-body irritation or nasolacrimal duct blockage with resultant epiphora
- In lagomorphs, 5 glands contribute to precorneal tear film. The orbital lacrimal gland is the primary source of aqueous components of tears with production of proteins that protect the ocular surface against bacteria (Harderian, nictating, lacrimal, infraorbital, exorbital)
- Schirmer Tear Test I- performed without the use of topical anesthetics providing a measure of both basal and reflex tearing
- Schirmer Tear Test II- performed after topical anesthesia demonstrates basal tearing alone
“An Incidence of Pseudopregnancy Associated with Social Enrichment of Rabbits \textit{(Oryctolagus cuniculi)}”

- Pseudopregnancy in rabbits can result from a sterile mating, an injection of luteinizing hormone, or from the stimulation caused when one doe mounts another, given that rabbits are induced ovulators.
- Pseudopregnancy generally lasts 16 to 18 days
- Chronic pseudopregnancy can cause complications including endometritis, pyometra, hydrometra, and mastitis
- Clinical signs of pseudopregnancy may be uterine and mammary gland enlargement, pulling hair from neck and ventrodorsal abdomen, nest building +/- discharge from urogenital area

“The Social Nature of European Rabbits \textit{(Oryctolagus cuniculus)}”

- Abnormal behaviors and stereotypies in rabbits include: sham digging, floor chewing, bar biting, trichophagy, and hair pulling
- Stereopathies occur during the quietest period of the day
- Compared with paired and penned rabbits, single housed rabbits exhibited the highest fear levels and incompatible behavioral patterns, suggesting that they were in the most stressful of the three housing conditions
  - Single housing of rabbits in cages that do not allow the normal exploratory and locomotor patterns such as rearing and hopping are deleterious to the rabbits’ well-being
- Relatedness (littermates), age (prior to puberty or just at 12 weeks), castration, and prior social housing experience increases the chance of successful social housing

“Original Research: Mouse Models of Aerosol-Acquired Tularemia Caused by \textit{Francisella tularensis} Types A and B”

- \textit{F. tularensis} can cause natural infections in rabbits
- \textit{F. tularensis} is a facultative, intracellular pathogen that multiples in macrophages and targets the reticuloendothelial system
- \textit{F. tularensis} is a Category A Select Agent (CDC/ NIAID- high morbidity and mortality)
  - \url{https://www.selectagents.gov/SelectAgentsandToxinsList.html}
  - \url{https://www.niaid.nih.gov/research/emerging-infectious-diseases-pathogens}

“Case Report: Mandibular Fracture and Necrotizing Sialometaplasia in a Rabbit”
Severe comminuted fracture of the left mandible ramus and body that led to necrotizing sialometaplasia (unilateral infarction of the mandibular salivary gland).

Four features differentiate necrotizing sialometaplasia from other salivary gland lesions and include: 1.) lobular necrosis of salivary tissue 2.) squamous metaplasia conforming to ductal or acinar outlines 3.) preservation of salivary lobular morphology 4.) variable inflammation and granulation tissue.

COMP MED 63 (4) August 2013 342-347

“Case Report: Multiple Complex Congenital Malformations in a Rabbit Kit (Oryctolagus cuniculi)”

- Congenital malformations occur during early embryogenesis stage of development
- Holoprosencephaly- impairment of midline cleavage of forebrain during development resulting in several facial malformations, including facial clefts, cyclopia, supraorbital proboscis
- Gastroschisis- congenital defect of abdominal wall through which abdominal organs eviscerate.
“Original Research: Experimental Infection of New Zealand White Rabbits (*Oryctolagus cuniculi*) with *Leporid herpesvirus 4*”

- **Leporid herpesvirus 4**: Alphaherpesvirus (dsDNA)
  - Herpes simplex virus-1, HSV-2, Varicella zoster virus, Cercopithecine herpesvirus 1, Feline herpes virus-1, Suid herpesvirus 1 (Aujeszky’s Disease/ pseudorabies), Equine herpesvirus 1, 3, 4, 8, 9, Bovine herpesvirus 1, 5, Gallid herpesvirus 1 (Marek’s disease)
- Clinical disease in NZW rabbits: ocularonasal discharge, respiratory distress, anorexia
- Gross disease: severe necrohemorrhagic bronchopneumonia and marked pulmonary edema, multifocal splenic necrosis

COMP MED 65 (5) October 2015 424-428

“Case Study: Delayed and Aberrant Presentation of VX2 Carcinoma in a Rabbit Model of Hepatic Neoplasia”

- VX2 squamous cell carcinoma cell line was isolated from a domestic rabbit with Shope papillomavirus-induced skin papilloma
- VX2 tumor cell inoculation results in reproducible, anaplastic carcinomas that grow rapidly with local tissue invasion, and frequently and predictably metastasize.

**COMP MED 65 (6) December 2015 499-507**

“Overview: Rabbit Models for Studying Human Infectious Diseases”

- HIV1 infection and AIDS: *Pan troglodytes* and gibbons are the only ape species fully susceptible to HIV1 infection, *Macaca mulatta* can be challenged with chimeric SHIV derived from SIV and HIV1; rabbits fail to show consistent signs of AIDS-like disease
- Human T-Lymphocyte virus type 1 (HTLV1) (ssRNA) leads to adult T Cell Leukemia-Lymphoma: rabbits and rats can be infected, rabbits respond similarly to humans in terms of antibody response, and simulate persistent asymptomatic infection manifested by most human patients
- Human Papillomavirus Infection (DNA Virus): Cottontail rabbit papillomavirus is similar in genomic structure and tumorigenesis and has been used as an animal model due to reliable and predictable induction of skin papillomas
- Ocular Herpes Infection (Herpes simplex virus type 1) (dsDNA): guinea pigs are used for genital herpesvirus infection, rabbits used for ocular due to large eyes, abundant tear film volume, and reliable induction of herpetic stromal keratitis with a similar disease course including viral reactivation
- Tuberculosis (*Mycobacterium tuberculosis*): Guinea pigs more susceptible to infection, but rabbits are the only model that develops pulmonary cavitation (usually with *M. bovis* inhalation). Immunosuppression with corticosteroids results in reactivation of disease (similar to humans)- immune reconstitution during tuberculosis infection after immunosuppression
- Syphilis (*Treponema pallidum ss. pallidum*): Organism can’t be grown in vitro due to reliance on host for nutrients – humans only natural reservoir for ssp. *pallidum*. Rabbits develop naturally occurring *Treponema paraluis-cuniculi*, which has antigenic cross-reactivity and similar symptoms to *T. pallidum*. Rabbits provide in vivo medium for propagation of *T. pallidum* and a primary model for studying pathogenesis and immunity of human syphilis

**COMP MED 66 (3) June 2016 216-219**

“Overview: Magnetic Resonance Imaging of Reptiles, Rodents, and Lagomorphs for Clinical Diagnosis and Animal Research”

- Anesthesia-associated risk in small animals is exacerbated by stress responses during induction of anesthesia; high surface area:volume ratio, which can lead to hypothermia; technical challenges with intubation; frequent vascular inflammation associated with venous access; and subclinical respiratory disorders
- 3 contrast agents are used for MRI 1.) gadolinium chelates (gadopentetate dimeglumine most common) 2.) manganese chelate (brain studies- ions shorten T1 and T2 relaxation times and supports mapping of functional brain activity) 3.) iron oxide particles
- Normal articular cartilage in adult rabbits is characterized by a short T2 time, and MRI can also be used in diagnosing infectious and non-infectious arthritis in rabbits
- T2 weighted images: Compartments filled with water (e.g. CSF compartments) appear bright and tissues with high fat content (e.g. white matter) appear dark. This is good for demonstrating pathology since most lesions are associated with an increase in water content.
- T1 weighted images: Tissues with high fat content (e.g. white matter) appear bright and compartments filled with water (e.g. CSF) appears dark. This is good for demonstrating anatomy.

COMP MED 67 (1) February 2017 51-55

“Case Report: Shope Fibroma in the External Ear Canal of a Domestic Rabbit”

- Shope fibroma virus (*Leporipoxivirus*) (*Poxviridae*), transmitted by biting arthropods, causes fibromas that manifest as freely movable, soft tissue swellings at the site of inoculation—most often the haired portion of the head, limbs, and pinna
  - Other *Leporipoxivirus*: hare fibroma virus, myxoma virus
- Histological lesions manifest as acute inflammation with localized fibroblastic proliferation