



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Veterinary Science

Fakulteit Veeartsenykunde
Lefapha la Diseanse tša Bongakadiriwa

Doctoral Celebration Programme

Lecture hall 1-37
Arnold Theiler Building

8 September 2017

Make today matter



Programme

07:55 – 08:00	Welcome by the Dean, Prof Darrell Abernethy
08:00 – 08:20	Prof Vinny Naidoo introduces Ms Olubukola Adenubi Acaricidal efficacy of crude extracts and isolated flavonoids from <i>Calpurnia aurea</i> subsp. <i>aurea</i> against <i>Rhipicephalus turanicus</i>
08:20 – 08:40	Dr Joseph Chamunorwa introduces Dr Odunayo Azeez Characterization of normal adipose tissue and pansteatitic tissue in the Nile Crocodile (<i>Crocodylus Niloticus</i>): Possible mechanism(s) of pathogenesis and pathophysiology
08:40 – 09:00	Prof Henk Bertschinger introduces Sr Ester Botha Immunocontraception of the domestic horse (<i>Equus caballus</i>) using a vaccine against GnRH
09:00 – 09:20	Dr Rebone Moerane introduces Dr Dauda Bwala <i>Mycoplasma gallisepticum</i> infection dynamics and vaccine protection in South African poultry
09:20 – 10:00	<i>Coffee/tea with snacks in foyer</i>
10:00 – 10:20	Prof Johan Nothling introduces Dr Daniela Steckler Assessment of female and male conception rate and correlation to quality of frozen-thawed semen in the dog
10:20 – 10:40	Dr Alri Pretorius introduces Ms Mabotse Tjale Transcriptome analysis of <i>Ehrlichia ruminantium</i> at the host tick bite site and during the developmental stages in cell culture
10:40 – 11:00	Prof Johan Nothling introduces Dr Kurt de Cramer Preparturient caesarean section in the bitch: justification, timing, execution and outcome evaluation
11:00	Announcement by the Dean, Prof Darrell Abernethy
11:10 – 12:00	<i>Refreshments for all in foyer</i> (Official photos with students, supervisors, HODs, Deputy Deans and the Dean)
In Absentia:	Prof Paul Oberholster and his PhD student, Ms Luisa Riato Development of diatom-based monitoring tools for assessing depressional wetland condition in the Mpumalanga Highveld region, South Africa





Ms Olubukola Adenubi



Prof Vinny Naidoo

Ticks rank only second to mosquitoes as important disease vectors. Unfortunately our current reliance on synthetic acaricides has led to both tick resistance and negative environmental impacts. In her thesis, **Acaricidal efficacy of crude extracts and isolated flavonoids from *Calpurnia aurea* subsp. *aurea* against *Rhipicephalus turanicus***, the promovenda evaluated the potential of developing a newer, safer acaricidal drug of plant origin. The aspects addressed in this study included an extensive review of available literature to find a suitable ethnobotanical lead. Meta-analysis of the available literature showed that numerous plants have potential for further development. Of the seventeen plants screened for their acaricidal activity and toxic potential in this study, extracts from *Schkuhria pinnata*, *Calpurnia aurea* and *Senna italica* demonstrated good acaricidal activity that compared favourably with the positive control, cypermethrin. Further fractionation of *C. aurea* allowed for the isolation of apigenin-7-O- β -D-glycoside and apigenin-7-O-rutinoside, which were not identified in this plant previously. Pilot studies into the possible mechanism of action showed the isolated compounds function through the inhibition of the acetylcholinesterase enzyme system and potassium channels. With two separate mechanisms being targeted, the isolated compounds show potential for further study, as compounds with multiple mechanisms of action are known to develop resistance much slower. The thesis provides an important contribution to knowledge by collating and critically analysing available information on plants, identifying acaricidal activity from plants and isolating active compounds. It is recommended that isolated compounds be further evaluated to see if chemical synthesis towards a marketable product can be achieved.

Supervisor	: Prof V Naidoo
Co-supervisor	: Prof JN Eloff
Co-supervisor	: Prof LJ McGaw
Internal examiner	: Prof N Lall
External examiner	: Prof SR Magano (University of South Africa)
External examiner	: Prof F Nchu (Cape Peninsula University of Technology)



Dr Odunayo Azeez



Dr Joseph Chamunorwa

Pansteatitis is generalized inflammation of the adipose tissue. An outbreak of pansteatitis in Nile crocodiles at the Olifants River and Loskop dam, Kruger National Park, Mpumalanga was responsible for the crocodile die offs in 2008 that resulted in a huge reduction in crocodile numbers in South Africa. Despite concerted efforts by various researchers on the condition, the pathophysiology and mechanism(s) of pathogenesis has not been elucidated.

In his thesis titled, **“Molecular characterization of the adipose tissue and pansteatitic tissue in the Nile crocodile (*Crocodylus niloticus*): possible mechanism(s) of pathogenesis and pathophysiology”** the promovendus characterized the adipose tissue in the Nile crocodile, structurally and functionally in health and in pansteatitis and the molecular basis of the observed changes; using histomorphology, ultrastructural studies, fatty acid methyl ester (FAME) analysis and Next Generation Sequencing (NGS) using RN-Seq for the first time in South Africa.

The study identified regional variation in the histomorphology and fatty acid composition of the adipose tissue, and greatly reduced FA content in pansteatitis. It also identified and documented the comprehensive composite transcripts that are expressed in this species for the first time and their possible roles in the pathogenesis of pansteatitis. Genes that were upregulated in pansteatitis were identified and annotated. These genes were found to be involved in Toll like receptor-signaling inflammatory pathways and insulin resistance. The study showed for the first time, that pansteatitis associated crocodile die offs could be a result of insulin resistance

Supervisor	: Dr JP Chamunorwa
Co-supervisor	: Prof RA Meintjes
Co-supervisor	: Prof MC Oosthuizen
Internal examiner	: Dr KP Sibeko-Matjila
External examiner	: Prof E Umapathy (Walter Sisulu University)
External examiner	: Dr FC Muchadeyi (Agricultural Research Council)



Sr Ester Botha



Prof Henk Bertschinger

Over the last 20-30 years immunocontraception has been used in various domestic and wildlife species to induce infertility for population control and to control sex-hormone related behaviour. The methods are based on the provocation of antibodies that target and interfere with specific processes required for normal reproduction. One of the methods commonly used is an anti-GnRH vaccine. Such vaccines stimulate production of antibodies which neutralise endogenous GnRH in the hypothalamus and, as a result block the downstream release of reproductive hormones. As such, GnRH vaccines have the potential to be effective in both females and males. Indications for the suppression of reproductive function in horses are to prevent indiscriminate breeding, control undesirable sex-related behaviour and to circumvent surgical risks associated with surgical gonadectomy. As the effects of GnRH vaccines are reversible, the loss of individual genetic potential can be prevented. In her thesis, **Immunocontraception of the domestic horse (*Equus caballus*) using a vaccine against GnRH**, the promovenda reported the successful down-regulation of ovarian and testicular activity in the horse following two administrations of an anti-GnRH vaccine. In addition, the reversibility of GnRH vaccine treatment could be demonstrated in mares. These results lend themselves to comparative studies in other species such as donkeys, African elephants and wild equids. This thesis provides new insights into the effects of anti-GnRH vaccination in horses. It has also contributed significantly to the current understanding of the endocrine control of equine reproduction

Supervisor	: Prof HJ Bertschinger
Co-supervisor	: Prof ML Schulman
External examiner	: Prof B Colenbrander (Utrecht University, The Netherlands)
External examiner	: Prof I Liu (University California, Davis, USA)
External examiner	: Dr CS Asa (St. Louis Zoo, USA)



Dr Dauda Bwala



Prof Celia Abolnik

In his thesis, ***Mycoplasma gallisepticum* infection dynamics and vaccine protection in South African poultry**, the promovendus investigated the diversity of *Mycoplasma gallisepticum* (MG) strains circulating within South African poultry industry, and developed a multifactorial disease challenge model using QX-like IBV to assess the efficacy of two commercially available vaccines, ts-11 and 6/85, against a circulating virulent MG field strain. He also assessed the tissue distribution of both MG and IBV using quantitative PCR to determine the preferential sites of replication and pathogenesis, and whether IBV co-infection and vaccination impacted on the spread and distribution of MG in the sampled tissues. The genetic diversity of MG in South Africa is described, and results strongly suggest that reassortments between vaccine and wild type strains have occurred in the field. It was confirmed that vaccination with ts-11 and 6/85 vaccines were still efficacious in protecting birds against challenge with a typical virulent South African MG strain, but the protection offered did not inhibit the development of tissue pathology. MG was also found to have minimal effect on tissue pathology and especially tracheal ciliary activity without IBV co-infection, but it was demonstrated that both MG and IBV can spread systemically to other non-respiratory organs. Vaccination with both vaccines delayed the colonization/replication of challenge pathogens, while in some instances it accelerated the elimination of the challenge pathogens through the provision of specific and non-specific protection.

Supervisor	:	Prof C Abolnik
External examiner	:	Prof RR Bragg (University of the Free State)
External examiner	:	Prof A Noormohammadi (University of Melbourne, Australia)
External examiner	:	Dr HW Joubert (Bioproperties Pty. Ltd)
External examiner	:	Dr SA Leigh (USDA-ARS Poultry Research Unit, USA)



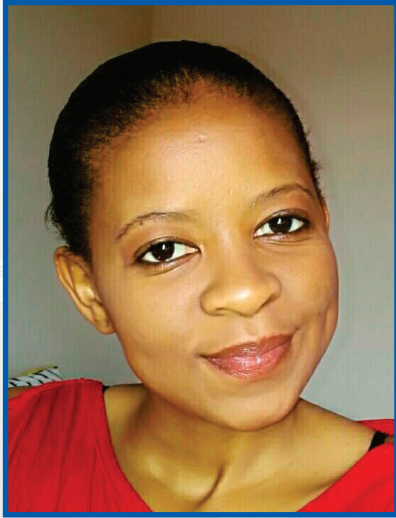
Dr Daniela Steckler



Prof Johan Nothling

In her thesis **Assessment of female and male conception rate and correlation to quality of frozen-thawed semen in the dog** the promovenda assessed different aspects of male and female fertility in the domestic dog which, used in conjunction, may increase the ability to estimate the fertilizing potential of frozen-thawed dog semen. In a multi-sire insemination trial using DNA analysis and paternity testing, it was shown that the optimal day for surgical insemination of bitches using frozen-thawed semen was 6 days after the concentration of progesterone in the plasma first reached 6 to 9 nmol/L. Concurrently the frozen-thawed semen used in the insemination trial was evaluated by means of conventional and modern semen evaluation methods, one of which—Merocyanine 540 staining—was newly validated on fresh dog sperm. Males were ranked according to their conception rate, which was then correlated to 40 sperm quality variables. The percentage of live sperm with destabilized membranes correlated negatively, and the ability of sperm to maintain their viability tended to correlate positively to conception rate. The probability of a bitch having more than one conceptus derived from a follicle was estimated by retrospectively evaluating data of fertility trials as well as collecting data from private practice and a welfare organization, thus establishing that the number of corpora lutea a bitch has may be used as an estimate of her maximum fecundity, despite the occurrence of multi-ovular follicles in the species.

Supervisor	: Prof JO Nothling
External co-supervisor	: Prof TAE Stout (Utrecht University, The Netherlands)
External examiner	: Prof WK Farstad (Norwegian University of Life Sciences, Norway)
External examiner	: Prof SK Goericke-Pesch (University of Copenhagen, Denmark)
External examiner	: Prof G van der Horst (University of the Western Cape)



Ms Mabotse Tjale



Dr Alri Pretorius

Heartwater poses a major threat to livestock productivity in Sub-Saharan Africa and there is a need for an improved vaccine. In her thesis **“Transcriptome analysis of *Ehrlichia ruminantium* at the host tick bite site and during the developmental stages in cell culture”**, the promovendus investigated differential expression of *E. ruminantium* genes prior to disease manifestation by using transcriptome sequencing. Since *E. ruminantium* has several growth stages in the mammalian and tick hosts, different proteins would be expressed at each of these stages and in the different hosts. These may be considered as vaccine targets. Differential expression was determined by transcriptome analyses and revealed that several *E. ruminantium* genes were exclusively up-/down-regulated in the elementary and reticulate bodies in mammalian and tick cell culture as well as in the skin biopsies of the tick bite site or tick salivary glands. Some of these genes were expressed and shown to be good targets for the activation of cellular or humoral immunity. Thus, indicating that RNA sequencing could be applied successfully to search for additional antigens for use in *E. ruminantium* recombinant vaccines. Collectively these findings will contribute to the design of *E. ruminantium* vaccines, which will elicit more focussed and effective immune responses. As such, the thesis provides an important contribution to the field of *E. ruminantium* vaccine development.

Supervisor	:	Dr A Pretorius
Co-supervisor	:	Dr J Liebenberg
Co-supervisor	:	Dr M van Kleef
Internal examiner	:	Dr KP Sibeko-Matjila
External examiner	:	Prof R Frutos (CIRAD - Agricultural Research for Development, France)
External examiner	:	Prof AE Lew-Tabor (The University of Queensland, Australia)



Dr Kurt de Cramer



Prof Johan Nothling

In his thesis **Preparturient caesarean section in the bitch: justification, timing, execution and outcome evaluation** the promovendus identified factors other than breed which increase the odds of still-birth and caesarean section (CS). This study showed that the inclusion of medetomidine in the anaesthetic protocol for CS is not a risk factor and having observed a dilated cervix safely indicates readiness for CS. It provides the clinician with expected ranges in haematocrit before and after parturient CS. This study showed that a chemiluminescent immunoassay is a reliable replacement for a discontinued radioimmunoassay to measure the concentration of progesterone (PC) in serum or plasma. It showed that the first day of cytological dioestrus (Day 0) precisely predicts the day of onset of parturition, that the foetal biparietal diameter is not useful in predicting readiness for CS and that the preparturient PC may be used to predict the time of cervical dilatation, thereby allowing timeous planned CSs in bitches where there is no predicted date of parturition. This study proved that it is safe to perform fixed date preparturient CSs on Day 57 and provides the veterinary obstetrician with a protocol to safely perform elective CSs in a large proportion of the obstetric population at a convenient time of the day. International recognition was attained by the discovery of the two sets of twins sharing a placenta. The one case included a suspected freemartin whereas the other confirmed the first case of monozygotic twinning in the dog.

Supervisor	: Prof JO Nothling
External examiner	: Prof SMS Chastant-Maillard (Toulouse National Veterinary School, France)
External examiner	: Prof AM Fontbonne (Ecole Nationale Veterinaire, France)
External examiner	: Prof MA Kutzler (Oregon State University, USA)



Ms Luisa Riato



Prof Paul Oberholster

Diatoms have a successful history of use as biological indicators of depressional wetland condition and in diagnosing potential stressors. In South Africa, there is currently no well-developed, reliable biological indicator tool to assess the biological condition of wetlands, where the use of other biological indicators, macroinvertebrates or macrophytes, have proved ineffective. In her thesis, **Development of diatom-based monitoring tools for assessing depressional wetland condition in the Mpumalanga Highveld region, South Africa**, the promovenda investigated diatoms as a potential biological indicator tool to assess depressional wetland condition in South Africa. Epiphytic diatoms were sampled from least human-disturbed temporary depressional wetlands during various stages of inundation. Species compositions of epiphytic diatom communities were strong indicators of temporally changing environmental conditions. Using the same diatom and physical and chemical data, it was demonstrated that simplifying the taxonomy by using the functional composition (ecological guilds, life-forms) of the epiphytic diatom communities, can assess temporally changing environmental conditions as effectively as the species composition. The use of diatom functional groups in aquatic assessments may have particular relevance in many African countries, including South Africa, where diatom species-level taxonomy is poorly understood and/or high-level taxonomic expertise is lacking. A diatom index of biotic integrity for acid mine drainage impacted permanent depressional wetlands in the Mpumalanga Highveld was created. The index was responsive to a gradient of AMD-pollution, and potentially could be used to measure the long-term status of permanent depressional wetlands and the effectiveness of remediation methods.

External supervisor	:	Prof PJ Oberholster (CSIR)
External co-supervisor	:	Dr V Della Bella (Arpa Umbria-Environmental Protection Agency of Umbria Region, Italy)
External co-supervisor	:	Dr M Leira (University of Lisbon, Portugal)
External examiner	:	Dr S Blanco Lanza (University of Leon, Spain)
External examiner	:	Dr I Lavoie-Plourde (Institut national de la recherche scientifique, centre Eau, Terre, Environnement (INRS), Canada)
External examiner	:	Dr CE Van Ginkel (Cripsis Environment)

