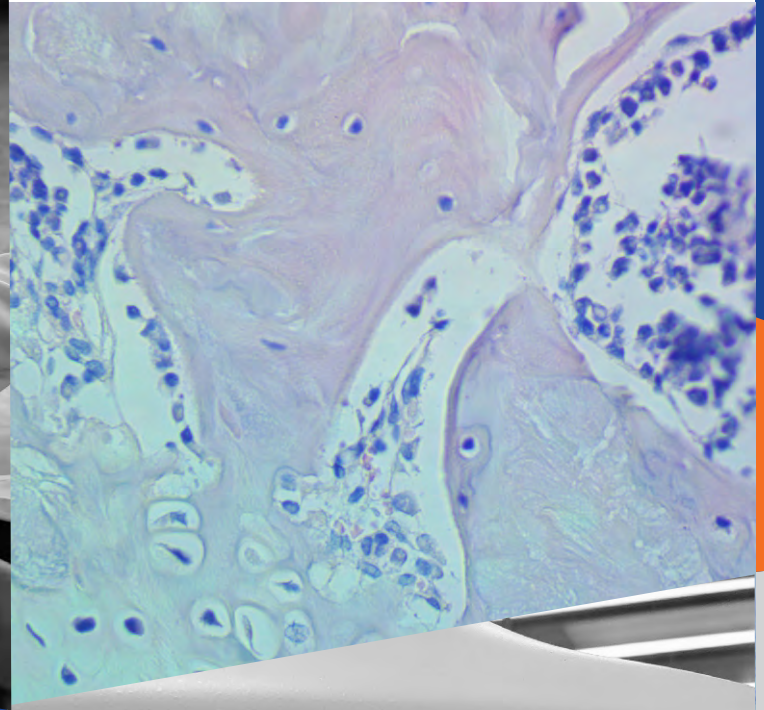

SEFAKO MAKGATHO
HEALTH SCIENCES UNIVERSITY

DEPARTMENT OF ANATOMY
School of Medicine

Anatomy – Harmonising morphology with molecular and cellular structure

- We look closer in order to fulfil our mission statement: promote interdisciplinary research, education and skills training that recognise the cross-disciplinary nature of holistic health care provision.
- We pay attention to the understanding of non–communicable diseases and how herbal remedies can be scientifically incorporated in the development of future therapeutics, especially in respect of type 2 diabetes
- Our research philosophy is premised on the following facts in respect of Anatomy as a discipline:
  * Every medical discipline is rooted in structure at a gross or molecular and cellular level
  * Anatomical research can help form a foundation for understanding disease
  * Anatomical sciences are the basis for development of new therapeutics for various diseases

To this end

On tissue, cell and molecular levels, side effects of herbal medications are explored and answers are sought for non-communicable diseases such as type 2 diabetes and cancers, which pose a serious public health risk in South Africa and beyond.

Studies in the effects of Phytomedicine

A. In general

Herbal medication has been used for more than 5000 years; however, scientific evidence of its effectiveness and effects on organ systems is still lacking. While herbal medication is perceived to be safe, many plants used in traditional medicine or used as food have demonstrated some toxicity, making it necessary that more research be done to established possible toxic effects of these plant products in organ systems. The concomitant side effects of conventional medication are a main driving force for discovering alternative herbal medication. The focus is on the systemic and neurobehavioural effects of the Southern African medicinal plants. Particular the effects of the plant on the brain, liver, kidneys, heart, reproductive and gastrointestinal systems.

Objective:

To establish the efficacy, mechanism of action and toxic effects of South African medicinal plants towards the development of new drugs.

Researcher involved:

Nkosiphendule Xhakaza

B. The minor seed variety of Ricinus *communis linn* (castor plant)

The minor seed variety of Ricinus communis linn (castor plant) is widely used around the world for traditional medicinal practices. Among the Rukuba ethnic group in Plateau state, Nigeria, its use as a female contraceptive is an ancient practice. In our previous work, we found the seed extract suppressed the ovarian cycle of adult cyclic Sprague-Dawley rats and suppressed testicular function in adult male Wistar rats, in a way similar to the anti-androgenic drug, cyproterone acetate. We believe Ricinus communis-linn not only to be a female contraceptive but also a potential male contraceptive of the future.

Objectives:

To ascertain the effect of the minor seed variety of Ricinus communis linn on 1) endometrial oestrogen receptors, 2) on testicular ICSH expression and 3) on pituitary FH and FSH in adult cyclic Wistar rats.

Researcher involved

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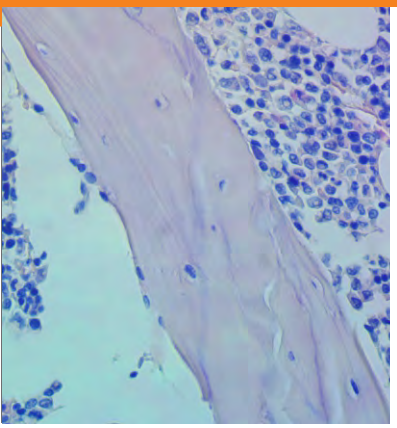

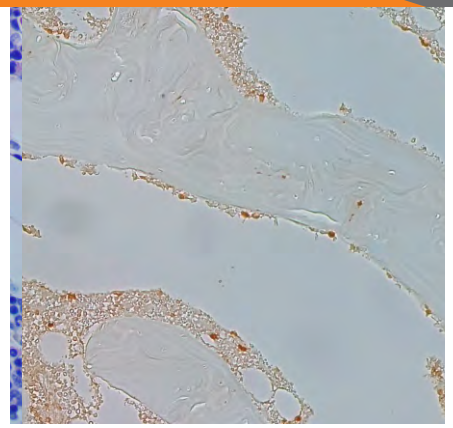

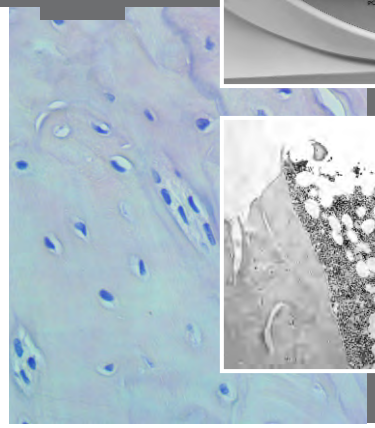

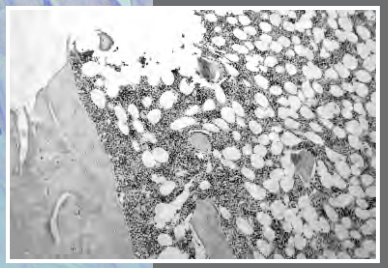

Type 2 diabetes mellitus induced multiorgan pathology

Type 2 diabetes (T2D) is a worldwide problem with a high morbidity and mortality rate. Although T2D is a preventable non-communicable disease, it causes a huge financial burden on health and social services especially in developing countries. Relatively few studies on the effect of T2D on the mandible (bone), the brain and digestive system have been performed. Despite use of animal models to study T2D since the past several decades, the challenge of finding a suitable translational model of T2D remains to date. Of the rodent models the Zucker Diabetic Sprague Dawley (ZDSD) rat which was derived from a cross breed between a diet-induced obese Sprague Dawley derived rat and lean ZDFfa/- rats may be more applicable for multiorgan studies involving bone, the brain (hippocampus) and the intestinal tract such as this.

We currently seek to investigate multiorgan pathology using bone, brain (hippocampus) and the intestinal tract in the ZDSD model of type 2 diabetes considering its intact leptin signalling pathway which is absent in other models. We also intend to understand the involvement of cytokines such as TGFB1, BMPs in bone, neurogenic activity in the hippocampus as well as mucin cell disturbances in the intestine. These features have been reported in humans and we therefore need to investigate whether the ZDSD model of type 2 diabetes will resemble similar features to confirm its suitability as a translation model of diabetes.

Objective:

To investigate whether the ZDSD model of type 2 diabetes will resemble similar features to confirm its suitability as a translation model of diabetes.

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