



THE FUTURE OF TISSUE ENGINEERING AND REGENERATIVE MEDICINE IN THE AFRICAN CONTINENT

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OUTLINE

- Definition of TE and RM
- Applications and Benefits
- Research work
- Challenges
- Recommendations to improve gender content and social responsibility of research programmes in Africa that can enhance the effectiveness and sustainability of the development measures needed



QUESTIONS ?

How can one create human spare parts that has been damaged?

Why do we have to create spare parts?



HOW? TISSUE ENGINEERING AND REGENERATIVE MEDICINE

- Is as **science of design** and manufacture of **new tissues** for the functional restoration of impaired organs and replacement of lost parts due to **cancer, diseases and trauma.**
- Creation of human spare parts?



WHY? DO WE HAVE TO CREATE HUMAN SPARE PARTS?

- Shortage of donor tissues and organs
- Survival rates for major organ transplantations are poor despite their high costs and the body's immune system often rejects donated tissue and organs.
- Tissue engineering and Regenerative Medicine therefore, has remarkable potential in the medical field to solve these problems



APPLICATIONS: HEART FAILURE

Heart Disease

- Adult bone marrow stem cells injected into the hearts arteries are believed to improve cardiac function in victims of heart failure or heart attack.

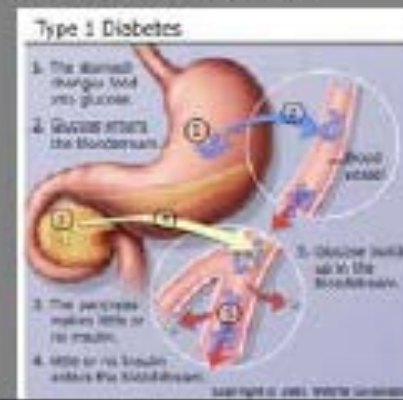




TYPE 1 DIABETES

Type I Diabetes

- Pancreatic cells do not produce insulin.
- Basic research focused on understanding how embryonic stem cells might be trained to become pancreatic islets cells needed to secrete insulin.



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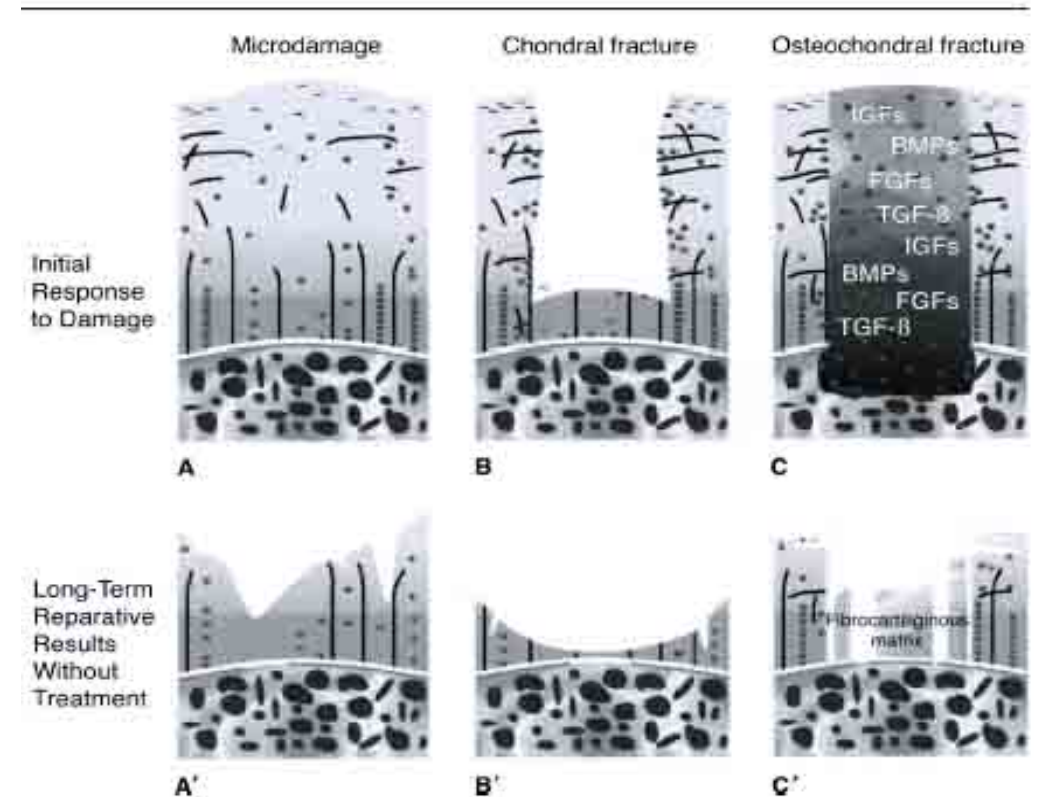
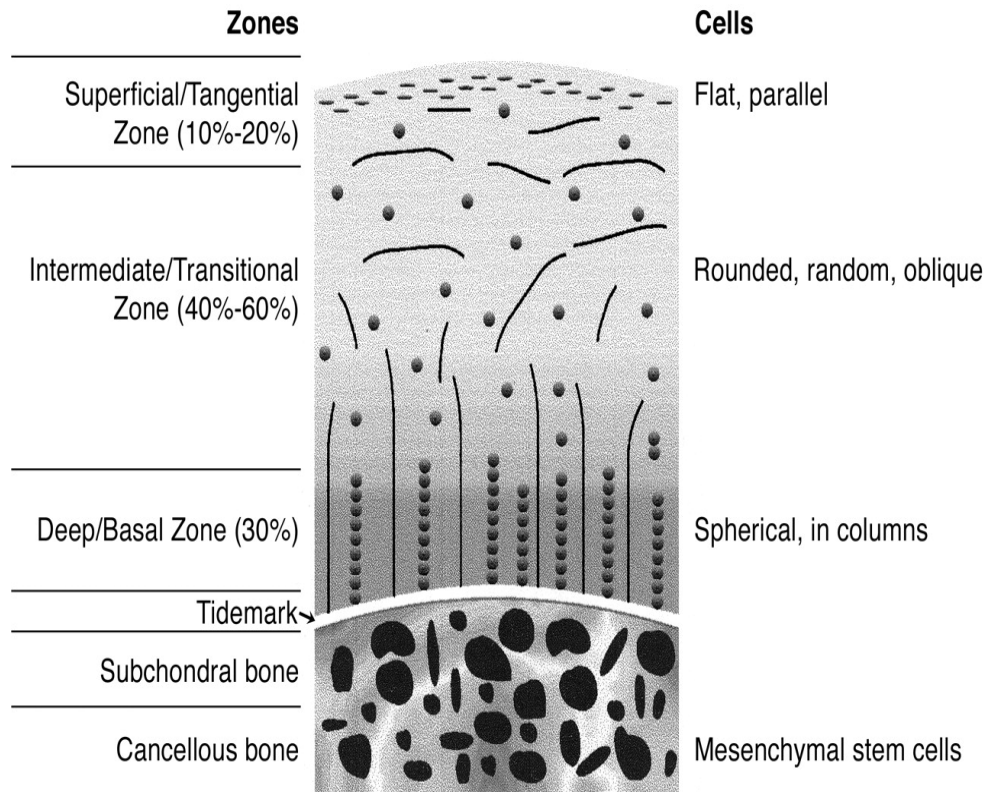
MY RESEARCH-TE AND RM OF AC FOR TREATING OA

- The goal of my research is to ameliorate the dreadful pain and impaired mobility in osteoarthritis by restoration of articular cartilage
- Articular cartilage is critical to the normal function of human and animal joints; it provides lubrication and load bearing, which makes friction-free locomotion possible.



- A dynamic change in the cartilage homeostasis precedes the initiation and progression of osteoarthritis, which is an unmet clinical challenge.
- Challenge to the Orthopedic Surgeons.

ARTICULAR CARTILAGE STRUCTURE





CURRENT TREATMENT

- Current treatment of OA focuses mainly on alleviation of pain and loss of joint function. The most common treatments of OA, worldwide, are the following:
- Allogeneic transplant (is a type of transplant where the recipient is not the same as the donor). Disadvantages are that much of the success of allogeneic transplants depends on finding a good match between the donor and the recipients.



- Specific medication, such as paracetamol and aspirin, are commonly used, to treat the pain from OA. In more severe cases, non-steroidal anti-inflammatory (NSAID) drugs such as ibuprofen, diclofenac and naproxen may reduce both pain and inflammation.
- Disadvantages: may also cause gastrointestinal discomfort, cramping, peptic ulcers and diarrhea.



WHY TISSUE ENGINEERING AND STEM CELLS

- (IKS) Medicinal plants and stem cells have the ability to regenerate cartilage and do not have any of the disadvantages mentioned above. Plant based morphogenetic proteins (Compound from medicinal plants)
- There is currently no treatment, which has restored injured cartilage to its original form with normal functional and structural properties.



CHALLENGES

- Do we have tissue engineering expertise in the African Continent to train (Scientist esp. females)

Answer: Yes/No

- Can we performed tissue engineering and regenerative medicine research in the African Continent?

Answer: Yes/No

(Dr Chris Barnard and Dr Mia)

- Do we have women in this field in South Africa?



CHALLENGES

- At the time of tenure. (biological clock), where intense workload demands of establishing an independent research program and fostering a young family exactly overlap, result in higher attrition rates in women vs. men in academic careers.
- A gender equality issue since lack of appropriate mentoring is also linked to higher attrition rates in women vs. men in academic positions.
- A male dominated culture in higher education and research council does not support the development and retention of women researchers



- Most research grant for young researchers have age limit to the disadvantage of women researchers who normally are late bloomers.

RECOMMENDATION : TO IMPROVE GENDER CONTENT

1. **Implement flexible family care spending**

- This awards enable grantees to use award funds for family-related expenses, such as childcare and eldercare
- Would allow individuals to travel to meetings, conferences, and workshops that may be important for early career advancement.
- Grant making organizations (UNESCO, MRC and NRFetc) and institutions must set up women positive award programs



FOCUS ON PSYCHOLOGICAL AND CULTURAL CHANGE

- Recruit gender-balanced external review committees and speaker selection committees (Proposals)
- Organizations that fund research and convene meetings should assemble gender-balanced review and speaker selection committees.



FOCUS ON EDUCATION AS A TOOL

- Institutions, grant makers, and scientists must commit to education as a tool to make progress towards gender equality, for example, through hosting and providing training seminars, workshops, and discussions, and share these resources with the scientific and lay community as widely as possible.
- Institutional transformation in the culture of the universities and research organization to support women researchers

OPPORTUNITIES FOR ADVANCING AWARENESS AND UNDERSTANDING OF GENDER ISSUES

- Having more women in senior administrative positions and enabling them to serve as appropriate mentors and role models to their younger colleagues could help avoid the traps in academic career development
- Recommendation suggests that funders, journals, and institutions should partner with existing organizations to develop and expand existing, searchable databases of women in science, engineering, and medicine.



- These resources will make it easier for search committees, conference organizers, institutions, and others to easily identify women scientists for positions and activities such as speaking opportunities, participation in review committees, serving on advisory boards, and others.



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THANK YOU!!!!!!!