CURRICULUM VITAE

BIOGRAPHIC INFORMATION

Full Name:	Nireshni Chellan
Highest Qualification:	PhD (Medical Physiology)
Job Title:	Specialist Scientist
Employer:	South African Medical Research Council
Other:	Honorary lecturer, Stellenbosch University
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CURRENT RESEARCH FOCUS

Chronic inflammation and oxidative stress are known perpetuators of pancreatic beta cell dysfunction and apoptosis in the progression of insulin resistance to type 2 diabetes. One of the primary drivers thereof is islet amyloid polypeptide (IAPP) induced toxicity. We are in the process of developing an advanced cell culture model for pancreatic beta cells that more closely mimics the complex pancreatic islet structure. To date we have established several *in vitro* pathophysiological models in immortalised beta cell lines mimicking conditions in type 2 diabetes, such as hyperglycaemia, hyperlipidaemia, inflammation and acute oxidative stress. We also take strides in advanced cell culture with the introduction of the BAM microgravitational system, which has allowed us to culture beta cell spheroids in excess of 90 days without passaging. These beta cell spheroids form the basis of the development of a clinically relevant cell culture model which will provide an innovative *in vitro* intermediate between conventional flat culture and the use of *in vivo* sentient animal models in the advancement of the study of the pathophysiology and potential therapeutic avenues associated with pancreatic islet dysfunction in type 2 diabetes.

- **International work experience**

Date	Description
January/February 2010	Vrijë University, Brussels, Belgium – JDRF Center for Beta Cell Therapy in Diabetes. BetaImage; transdifferentiation of exocrine pancreatic cells; rodent models (mouse) of islet neogenesis.
February/March 2010	MC^2 Biotek, Odense, Denmark – DrugMode. Hepatocyte VSP™ bioreactor cultures and assays.
November 2011	Tokyo University of Agriculture and Technology, Fuchu, Tokyo – Nutritional Physiochemistry. Insulinoma-based cell culture assays.
November 2015 - March 2016	The Università Politecnica Delle Marche – Flow cytometric analysis of viability and oxidative stress in RIN-5F insulinoma cells.

- **Areas of experience and/or expertise**

Field	Description
In vitro cell culture	Aseptic technique; development, implementation and use of cellular metabolism assays; method validation; pancreatic beta-cell functional assessments.
Ex vivo cell culture	Culture and *ex vivo* protein labeling of animal tissue biopsies; pancreatic islet and peripheral mononuclear cell isolation, culture and assays.
3D-cell and tissue culture	Generation and culture of 3D pseudo islets; culture of tissue biopsies.
Molecular biology	qRT-PCR and Western blot analysis.
Immunohistochemistry	Immunohistochemical labeling of processed tissue sections.
Fluorescent imaging	Oxidative stress, apoptosis/necrosis and function of insulinoma cells.
Flow cytometry	Oxidative stress and cell viability analysis.
Image analysis	Capture and assessment of immunohistochemically labelled sections; assessment of 2D protein gels.
In vivo research models	Murine and non-human primate; basic animal husbandry; postmortem; blood collection; glucose monitoring.

SCIENTIFIC AND OTHER PUBLICATIONS

Peer-reviewed journal publications:

1. **N. Chellan**, D. De Beer, C.J.F. Muller, E. Joubert, J. Louw, A toxicological assessment of *Athrixia phylicoides* aqueous extract following chronic ingestion in a rat model. Human and Experimental Toxicology 2008; 27 (11) 819-825.
2. **N. Chellan**, D. De Beer, C.J.F. Muller, E. Joubert, B.J. Page, J. Louw, An *in vitro* assessment of the effect of *Athrixia phylicoides* DC. aqueous extract on glucose metabolism. Phytomedicine 2012; 19 (8-9) 730-736.
3. C.J.F. Muller, E. Joubert, C. Pheiffer, S. Ghoor, M. Sanderson, **N. Chellan**, S.J. Fey, J. Louw, Z-2Z-2-(β-D-glucopyranosyloxy)-3-phenylpropenoic acid, an α-hydroxy acid from rooibos (*Aspalathus linearis*) with hypoglycemic activity. Molecular Nutrition and Food Research 2013, 00, 1–8, DOI 10.1002/mnfr.201300294.
4. **N. Chellan**, E. Joubert, H. Strijdom, C. Roux, J. Louw, C. J. F. Muller, Aqueous Extract of Unfermented Honeybush (*Cyclopia maculata*) Attenuates STZ-induced Diabetes and β-cell Cytotoxicity. Planta Medica 2014; 80: 622-629.
5. I. Mathijs, D.A. Da Cunha, E. Himpe, L. Ladriere, **N. Chellan**, C.R. Roux, E. Joubert, C. Muller, M. Cnop, J. Louw, L. Bouwens. A phenylpropenoic acid glucoside phytochemical augments pancreatic beta cell mass in high-fat diet-fed mice and protects beta cells from ER stress-induced apoptosis. Molecular Nutrition and Food Research 2014; 58 (10): 1980-1990.
6. C.J.F. Muller, C.J. Malherbe, **N. Chellan**, K. Yagasaki, Y. Miura, E. Joubert. Potential of Rooibos, its Major C-Glucosyl Flavonoids and Z-2-(β-D-Glucopyranoloxy)-3-phenylpropenoic acid in Prevention of Metabolic Syndrome. Critical Reviews in Food Science and Nutrition 2018 22; 58 (2): 227-246.
7. D. Truter, **N. Chellan,** H. Strijdom, I Webster, J Rawstorne, S.H. Kotzé. Histomorphological changes in the pancreas and kidney and histopathological changes in the liver in male Wistar rats on antiretroviral therapy and melatonin treatment. Acta Histochemica 2018 Mar 28; pii:

S0065-1281(18)30036-9. doi: 10.1016/j.acthis.2018.03.006.

8. P. Orlando, **N. Chellan,** J. Louw, L. Tiano, I. Cirilli, P. Dludla, E. Joubert, C.J.F. Muller, Aspalathin-rich green Rooibos extract lowers LDL-cholesterol and oxidative status in high-fat diet-induced diabetic Vervet monkeys. Molecules, 2019; 24(9). doi: 10.3390/molecules24091713.
9. J. Layman, D.L. Pereira, **N. Chellan**, B Huisamen, S.H. Kotzé. A histomorphometric study on the hepatoprotective effects of a green rooibos extract in a diet-induced obese rat model. Acta Histochem. 2019 May 29; doi: 10.1016/j.acthis.2019.05.008.
10. Samodien E, Johnson R, Pheiffer C, Mabasa L, Erasmus M, Louw J, **Chellan N**. Diet-induced hypothalamic dysfunction and metabolic disease, and the therapeutic potential of polyphenols. Mol Metab. 2019; 27:1–10

Book chapter publication:

11. E. Joubert, C. J. F. Muller, D. De Beer, R. Johnson, **N. Chellan** and J. Louw, The potential role of phenolic acids in tea and herbal teas in modulating effects of obesity and diabetes. In: Phenolic Acids: Composition, Applications and Health Benefits. Nova Science Publishers, Inc. 2012; ISBN: 978-1-61942-032-82011; 173-211.

Peer-reviewed abstract publications:

12. **N. Chellan**, D. De Beer, C.J.F. Muller, E. Joubert, J. Louw, An *in vitro* assessment of the antidiabetic potential of *Athrixia phylicoides* aqueous extract. Scientific Research and Essays, 2011.
13. **N. Chellan**, C.J.F. Muller, E. Joubert, H. Strijdom and J. Louw, Unfermented aqueous honeybush extract (*Cyclopia maculata*) attenuates STZ-induced β-cell cytotoxicity. Diabetologia 2013; 56 (1): S217-S218.
14. **N. Chellan**, E. Joubert, H. Strijdom, J. Louw and C.J.F. Muller, *Cyclopia maculata* and pancreatic β-cell protection in type 2 diabetes. Journal of Endocrinology, Metabolism and Diabetes of South Africa 2015; 20 (1): 29.
15. P. Orlando, **N. Chellan,** C.J.F. Muller, J. Louw, C. Chapman, E. Joubert and L. Tiano, Green Rooibos Extract improves plasma lipid profile and oxidative status in diabetic non-human primates. Free Radical Biology and Medicine 2017; 108(1): S97.

- **International presentations**

1. International Poster Presentations:

• N. Chellan, C.J.F. Muller, E. Joubert, H. Strijdom and J. Louw, Unfermented aqueous honeybush extract (*Cyclopia maculata*) attenuates STZ-induced β-cell cytotoxicity. European Association for the Study of Diabetes Conference, September 2013.

2. International Oral Presentations:

• N. Chellan, D. De Beer, C.J.F. Muller, E. Joubert, J. Louw, A toxicological assessment of *Athrixia phylicoides* aqueous extract in a rat model. Pharmatox Conference, 2007.

• N. Chellan, D. De Beer, C.J.F. Muller, E. Joubert, J. Louw, *Athrixia Phylicoides*: An *in vitro* and *in vivo* heptocytotoxic assessment. Pharmatox Conference, 2009.

• N. Chellan, C.J.F. Muller, E. Joubert, J. Louw, The effect of *Aspalathus linearis* aspalathin enriched, unfermented extract on gluco-lipotoxicity in RIN-5F pancreatic beta-cells. Tokyo University of Agriculture and Technology, Department of Nutritional Physiochemistry, 2011.

• N. Chellan, E. Joubert, H. Strijdom, J. Louw, C. Muller, The protective effect of an unfermented, aqueous *Cyclopia maculata* extract in pancreatic islets. Islet Society Meeting, July 2014.

• N. Chellan, J. Burger, J-L Jansen van Vuuren, C. Muller, A novel assessment of the role of beta secretase in pancreatic beta cell pathophysiology. European Association for the Study of Diabetes Scientist Training Course, November 2017.

• Muller C, Chellan N, Joubert E, Louw J. Effects of Rooibos on microbiota dysbiosis: implications for diet-induced metabolic dysfunction. 11th World Congress on Endocrinology and Metabolic Disorders. September 2018 Auckland, New Zealand

3. **Research Translation – Media Engagement:**

• Radio Interviews - Cape Talk, EWN (November 2016, June 2018).

• Television interviews – eNCA, SA (November 2016); Ricochet TV, UK (February 2017).

STUDENT SUPERVISORY RECORD

1. MSC Students

- Primary supervisor:
  - Ms N.T. Ngema, University of Zululand, 2015-2016.
  - Ms J. Burger, University of Stellenbosch, 2017-2018.
- Co-supervisor:
  - Ms S. Nel, Stellenbosch University, 2016-2017.
  - Ms D. Truter, Stellenbosch University, 2016-2017.
  - Ms D. Pereira, Stellenbosch University, 2016-2017.
  - Ms J. Layman, Stellenbosch University, 2017-2018.

2. PhD Students

- Primary supervisor:
  - Ms Y. Ntamo, University of Zululand, 2017-2020*.
- Co-supervisor:
  - N/A