CURRICULUM VITAE

Babalwa Unice Jack

Gender: Female
Nationality: South African
Email: Babalwa.Jack@mrc.ac.za; jackbabalwa@gmail.com
Cell: +27 81 299 4069
Tel: +27 21 938 0336 (W)

ACADEMIC HISTORY:

2022:	**Certificate in Management Development Programme (Short-Course), University of Stellenbosch, Stellenbosch Business School Executive Development (SBS-ED)**
2016:	**PhD Medical Physiology, University of Stellenbosch** **Thesis:** An investigation into the anti-obesity properties of *Cyclopia* species
2013:	**MSc (Biotechnology), University of the Western Cape** **Thesis:** The effect of nitric oxide on soybean superoxide dismutase activity during osmotic stress
2011:	**BSc Honours (Biotechnology), University of the Western Cape** **Thesis:** Proteomic analysis of heat shock response in H9c2 cells
2010:	**BSc (Biotechnology), University of the Western Cape**

TRAINING AND WORKSHOPS ATTENDED:

2022:	ClinoStar System User Training: CelVivo ClinoStar 3D culture as long-term *in vitro* tissue culture model, Odense, Denmark
2021:	Africa Research Excellence Fund (AREF) Essential Grant Writing Skills Workshop, Virtual
2015:	Science communication workshop, University of Stellenbosch, Stellenbosch, South Africa
2014:	Course diploma: (BMB 206) in 3D spheroid culture as a long-term *in vitro* cell culture model from the Tissue Culture Engineering Laboratory, University of Southern Denmark, Odense, Denmark and the South African Medical Research Council, Cape Town, South Africa.
2010:	Certificate in laboratory safety training issued by SafeNet Africa, University of the Western Cape, Cape Town, South Africa
2010:	Certificate in chemical safety training issued by SafeNet Africa, University of the Western Cape, Cape Town, South Africa
2010:	Certificate of attendance in centrifugation and liquid handling issued by Eppendorf, University of the Western Cape, Cape Town, South Africa

CAREER HISTORY:

12/2021 – present:	**South African Medical Research Council, Biomedical Research and Innovation Platform –** Senior Scientist (seasoned)
01/2019 – 11/2021:	**South African Medical Research Council, Biomedical Research and Innovation Platform –** Senior Scientist (competent)

02/2018 – 12/2018: **South African Medical Research Council, Biomedical Research and Innovation Platform –** Senior Scientist (entry)

10/2016 – 01/2018: **South African Medical Research Council, Biomedical Research and Innovation Platform –** Scientist (entry)

04/2013 – 09/2016: **South African Medical Research Council, Biomedical Research and Innovation Platform -** Research intern

02/2011 – 11/2012: **University of the Western Cape (UWC), Department of Biotechnology -** Undergraduate student assistant and practical demonstrator

01/2010 – 12/2010: **University of the Western Cape (UWC) -** HIV/AIDS Peer Educator (volunteer)

EXPERIENCE AND/OR EXPERTISE:

Field	Description
In vitro cell culture biology	Aseptic techniques Culturing and differentiation of 3T3-L1 adipocyte cell model and development of dysfunctional models Culturing of C2C12 muscle, H9c2 cardiomyocyte and C3A hepatocyte cells Basic 3D culture of spheroids *In vitro* bioassays and cell imaging
Molecular biology	Western Blot analysis ELISA Assays Quantitative real-time PCR
In vivo animal models	Basic animal husbandry Handling db/db mouse model (measuring body weight, food intake, water intake and blood glucose monitoring)
Natural Products	Plant extraction using solvent-based methods Fractionation of extracts using liquid-liquid fractionation High-performance liquid chromatography (HPLC) for identification/quantification of phenolic compounds High-performance counter-current chromatography (HPCCC) for separating, identifying, and quantifying phenolic Compounds

AWARDS AND RESEARCH GRANTS RECEIVED:

2024: Competitive Support for Unrated Researchers, National Research Foundation, 2024-2026

2021: Thuthuka research grant, National Research Foundation, 2021-2023

2018: Thuthuka research grant, National Research Foundation, 2018-2020

2015: PSSA travel award

2015: Whitehead Scientific travel award

2015: Harry Crossley Research Funding, University of Stellenbosch

2014 - 2015: Ernst & Ethel Erikson Trust Bursary

2013 - 2016: SAMRC internship scholarship programme (PhD)

2009: HCI foundation undergraduate bursary

2008: Golden Key International Honour Society

2008 - 2009: Breede Valley municipality mayoral bursary

PEER-REVIEWED ARTICLES:

Jack BU, Malherbe CJ, Huisamen B, Gabuza K, Mazibuko-Mbeje S, Schulze AE, Joubert E, Muller CJF, Louw J, Pheiffer C. 2017. A polyphenol-enriched fraction of *Cyclopia intermedia* decreases lipid content in 3T3-L1 adipocytes and reduces body weight gain of obese db/db mice. South African Journal of Botany, 110, 216-229.

Jack BU, Malherbe CJ, Willenburg EL, de Beer D, Huisamen B, Joubert E, Muller CJF, Louw J, Pheiffer C. 2018. Polyphenol-enriched fractions of *Cyclopia intermedia* selectively affect lipogenesis and lipolysis in 3T3-L1 Adipocytes. Planta Medica, 84(02), 100-110.

Dludla PV*, **Jack BU*,** Viraragavan A*, Pheiffer C, Johnson R, Louw J, Muller CJF. 2018. A dose-dependent effect of dimethyl sulfoxide on lipid content, cell viability and oxidative stress in 3T3-L1 adipocytes. Toxicology Reports, 5, 1014–1020.

Dludla PV, Nkambule BB, **Jack B,** Mkandla Z, Mutize T, Silvestri S, Orlando P, Tiano L, Louw J, Mazibuko-Mbeje SE. 2019. Inflammation and oxidative stress in an obese state and the protective effects of gallic acid. Nutrients, 11(1), 23.

Jack BU, Malherbe CJ, Mamushi M, Muller CJF, Joubert E, Louw J, Pheiffer C. 2019. Adipose tissue as a possible therapeutic target for polyphenols: A case for *Cyclopia* extracts as anti-obesity nutraceuticals. Biomedicine & Pharmacotherapy, 120, 109439.

Pheiffer C, Dias S, **Jack B,** Malaza N, Adam S. 2021. Adiponectin as a potential biomarker for pregnancy disorders. International Journal of Molecular Sciences, 22(3), 1326.

Jack BU, Mamushi M, Viraragavan A, Dias S, Pheiffer C. 2022. Comparing the effects of tumor necrosis factor alpha, lipopolysaccharide, and palmitic acid on lipid metabolism and inflammation in murine 3T3-L1 adipocytes. Life Sciences, 297, 120422.

Ntamo Y, **Jack B,** Ziqubu K, Mazibuko-Mbeje SE, Nkambule BB, Nyambuya TM, Mabhida SE, Hanser S, Orlando P, Tiano L, Dludla PV. 2022. Epigallocatechin gallate as a nutraceutical to potentially target the metabolic syndrome: novel insights into therapeutic effects beyond its antioxidant and anti-inflammatory properties. Critical Reviews in Food Science and Nutrition, 64:1, 87-109.

Dludla PV, Nkambule BB, Cirilli I, Marcheggiani F, Mabhida SE, Ziqubu K, Ntamo Y, **Jack B,** Nyambuya TM, Hanser S, Mazibuko-Mbeje SE. 2022. Capsaicin, its clinical significance in patients with painful diabetic neuropathy. Biomedicine & Pharmacotherapy, 153, 113439.

Pheiffer C, Dias S, Mendham AE, **Jack B,** Willmer T, Eshibona N, Bendou H, Pretorius A, Goedecke J. 2022. Changes in subcutaneous adipose tissue microRNA expression in response to exercise training in African women with obesity. Scientific Reports, 12, 18408.

Ziqubu K, Dludla PV, Moetlediwa MT, Nyawo TA, Pheiffer C, **Jack BU,** Nkambule B, Mazibuko-Mbeje SE. 2023. Disease progression promotes changes in adipose tissue signatures in type 2 diabetic (db/db) mice: The potential pathophysiological role of batokines. Life Sciences, 313, 121273.

Jack BU, Ramharack P, Malherbe C, Gabuza K, Joubert E, Pheiffer C. 2023. *Cyclopia intermedia* (honeybush) induces uncoupling protein 1 and peroxisome proliferator-activated receptor alpha expression in obese diabetic female db/db mice. International Journal of Molecular

Sciences, 24, 3868.

Jackson HC, Pheiffer C, **Jack B,** Africander D. 2023. Time- and glucose-dependent differentiation of 3T3-L1 adipocytes mimics dysfunctional adiposity. Biochemical and Biophysical Research Communications, 671, 286-291.

Ziqubu K, Mazibuko-Mbeje SE, Mthembu SXH, Mabhida SE, **Jack BU,** Nyambuya TM, Nkambule BB, Basson AK, Tiano L, Dludla PV. 2023. Anti-obesity effects of metformin: A scoping review evaluating the feasibility of brown adipose tissue as a therapeutic target. International Journal of Molecular Sciences, 24, 2227.

Moetlediwa MT, Ramashia R, Pheiffer C, Titinchi SJJ, Mazibuko-Mbeje SE, **Jack BU.** 2023. Therapeutic effects of curcumin derivatives against obesity and associated metabolic complications: A review of *in vitro* and *in vivo* studies. 2023. International Journal of Molecular Sciences, 24, 14366.

Ziqubu K, Dludla PV, Mthembu SXH, Nkambule BB, Mabhida SE, **Jack BU,** Nyambuya TM, Mazibuko-Mbeje SE. 2023. An insight into brown/beige adipose tissue whitening, a metabolic complication of obesity with the multifactorial origin. Frontiers in Endocrinology, 14, 1114767.

Ziqubu K, Dludla PV, Mabhida SE, **Jack BU,** Keipert S, Jastroch M, Mazibuko-Mbeje SE. 2024. Brown adipose tissue-derived metabolites and their role in regulating metabolism. Metabolism, 150, 155709.

Moetlediwa MT, **Jack BU,** Mazibuko-Mbeje SE, Pheiffer C, Jack BU, Titinchi SJJ, Salifu EY, Ramharack P. 2024. Evaluating the therapeutic potential of curcumin and synthetic derivatives: A computational approach to anti-obesity treatments. International Journal of Molecular Sciences, 25, 2603.

CONFERENCE ABSTRACT PUBLISHED:

Jack BU, Malherbe C, Huisamen B, Mazibuko S, Joubert E, Muller C, Louw J, Pheiffer C. 2015. An investigation into the anti-obesity properties of polar and non-polar fractions of *Cyclopia* in 3T3-L1 adipocytes. Journal of Endocrinology, Metabolism, and Diabetes of South Africa (JEMDSA), 20(1), 45.

Jack BU, Malherbe CJ, Huisamen B, Joubert E, Muller CJF, Louw J, Pheiffer C. 2017. Identification of polyphenolic compounds responsible for the anti-obesity properties of *Cyclopia intermedia* (honeybush) using high performance counter-current chromatography. Journal of Endocrinology, Metabolism, and Diabetes of South Africa (JEMDSA), 22(1), 30.

Jack BU, Malherbe CJ, Huisamen B, Gabuza K, Mazibuko-Mbeje S, Joubert E, Muller CJF, Louw J, Pheiffer C. 2017. A polyphenol-enriched fraction of *Cyclopia intermedia* decreases lipid content in 3T3-L1 adipocytes and reduces bodyweight gain in obese diabetic mice. Journal of Global Diabetes and Clinical Metabolism, 2, 1.

Jack B, Malherbe C, Joubert E, Muller C, Louw J, Pheiffer C. 2018. Ameliorative properties of *Cyclopia intermedia* (honeybush) against lipid accumulation and oxidative stress in the liver and adipose tissues of $lepr^{db/db}$ mice. Journal of Endocrinology, Metabolism, and Diabetes of South Africa (JEMDSA), 23(3), S1-S162.

Pheiffer C, Dias S, Mendham A, **Jack B,** Willmer T, Eshibona N, Hocine B, Pretorius A, Goedecke

J. 2023. MicroRNA expression in subcutaneous adipose tissue changes in response to exercise training in obese African women. Diabetes Research and Clinical Practice, 197, 110266.

SCIENTIFIC PRESENTATIONS:

Jack BU, Malherbe C, Huisamen B, Mazibuko S, Louw J, Muller C, Joubert E and Pheiffer C. The effects of *Cyclopia maculata, Cyclopia subternata and Cyclopia intermedia* on lipid accumulation in 3T3-L1 adipocytes. 58th Annual Academic Day, Stellenbosch University, Tygerberg, South Africa, August 2014. **Poster Presentation.**

Jack BU, Malherbe C, Huisamen B, Mazibuko S, Gabuza K, Louw J, Muller C, Joubert E and Pheiffer C. The *in vitro* and *in vivo* anti-obesity effects of a non-polar fraction of *Cyclopia intermedia*. Physiology Society of Southern Africa (PSSA) Conference, Parys, South Africa, 6-9 September 2015. **Oral Presentation.**

Jack BU, Malherbe C, Huisamen B, Mazibuko S, Gabuza K, Louw J, Muller C, Joubert E and Pheiffer C. The *in vitro* and *in vivo* anti-obesity effects of a non-polar fraction of *Cyclopia intermedia*. Early Career scientist convention, South African Medical Research Council, Parow, South Africa, October 2015. **Poster Presentation.**

Jack BU, Malherbe C, Huisamen B, Louw J, Muller C, Joubert E, Pheiffer C. Identification of anti-obesity compounds in *Cyclopia intermedia* (honeybush tea) using bioactivity guided fractionation. Physiology Society of Southern Africa (PSSA) Conference, Cape Town, South Africa, 28-31 August 2016. **Oral Presentation.**

Jack BU, Malherbe CJ, Huisamen B, Mazibuko-Mbeje S, Gabuza K, Joubert E, Muller CJF, Louw J, Pheiffer C. A polyphenol-enriched fraction of *Cyclopia intermedia* decreases lipid content in 3T3-L1 adipocytes and reduces bodyweight gain in obese diabetic mice. Global Conference on Obesity Treatment and Weight Management, Las Vegas, United States, 20-22 March 2017. **Poster Presentation.**

Jack BU, Malherbe CJ, Huisamen B, Joubert E, Muller CJF, Louw J, Pheiffer C. 2017. Identification of polyphenolic compounds responsible for the anti-obesity properties of Cyclopia intermedia (honeybush) using high performance counter-current chromatography. 52nd Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) Congress, Johannesburg, South Africa, 5-7 May 2017. **Poster Presentation.**

Jack BU, Malherbe CJ, Joubert E, Muller CJF, Louw J, Pheiffer C. Ameliorative properties of *Cyclopia intermedia* (honeybush) against lipid accumulation and oxidative stress in the liver and adipose tissues of *Lepr$^{db/db}$* mice. International Congress of Endocrinology, Cape Town, South Africa, 1-4 December 2018. **Poster Presentation.**

Mamushi MP, **Jack BU,** Du Plessis SS, Pheiffer C. Differentiation in high glucose increases lipid accumulation, lipolysis and oxidative stress 3T3-L1 adipocytes. Physiology Society of Southern Africa (PSSA) Conference, East London, South Africa, 18-21 August 2019. **Oral Presentation.**

Mamushi MP, **Jack BU,** Du Plessis SS, Pheiffer C. Differentiation in high glucose increases lipid accumulation, lipolysis and oxidative stress 3T3-L1 adipocytes. 13th Annual Early Career Scientist Convention, SAMRC, Cape Town, South Africa, 9-11 October 2019. **Poster Presentation.**

Mamushi MP, **Jack BU,** Du Plessis SS, Pheiffer C. Differentiation in high glucose increases lipid accumulation, lipolysis and oxidative stress 3T3-L1 adipocytes. 9th Biomedical Research and Innovation Platform (BRIP) Symposium, Cape Town, South Africa, 21 October 2019. **Oral**

Presentation.

Jack BU, Mamushi M, Viraragavan A, Nyawo T, Dias S, Pheiffer C. Tumor necrosis factor alpha, lipopolysaccharide and palmitic acid synergistically induce lipolysis, mitochondrial dysfunction, and reduce adiponectin production in 3T3-L1 adipocytes. African Association of Physiological Sciences (AAPS) and the Physiological Society of Southern Africa (PSSA) Congress, Virtual, 12 - 15 September 2021. **Oral Presentation.**

Nyawo TA, Mazibuko-Mbeje SE, Dludla PV, **Jack B,** Sadie-Van Gijsen H, Strijdom H, Pheiffer C. Morphological and gene expression differences in cardiac, retroperitoneal, and inguinal fat in an experimental model of obesity and type 2 diabetes. 11th Biomedical Research and Innovation Platform (BRIP) Symposium, Cape Town and Virtual, South Africa, 18 - 19 October 2021. **Oral Presentation.**

Ramashia R, Pheiffer C, Titinchi S, Ramharack P, Windvogel S, **Jack B**. Evaluating the effect of synthetic curcumin derivatives on skeletal muscle metabolism. 67th Annual Academic Day, Stellenbosch University, Tygerberg, South Africa, August 2023. **Oral Presentation.**

Ramashia R, Pheiffer C, Titinchi S, Ramharack P, Windvogel S, **Jack B**. Evaluating the effect of synthetic curcumin derivatives on skeletal muscle metabolism. 56th Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) Congress, East London, South Africa, 8 - 10 September 2023. **Poster Presentation.**

Ramashia R, Pheiffer C, Titinchi S, Ramharack P, Windvogel S, **Jack B**. Evaluating the effect of synthetic curcumin derivatives on skeletal muscle metabolism. 13th Biomedical Research and Innovation Platform (BRIP) Symposium, Cape Town, South Africa, 16 - 17 October 2023. **Oral Presentation.**

Moetlediwa MT, Ramharack P, Pheiffer C, Titinchi SJJ, Mazibuko-Mbeje SE, **Jack B**. Evaluating the effect of synthetic curcumin derivatives on skeletal muscle metabolism. 13th Biomedical Research and Innovation Platform (BRIP) Symposium, Cape Town, South Africa, 16 - 17 October 2023. **Oral Presentation.**

Moetlediwa MT, Ramharack P, Pheiffer C, Titinchi SJJ, Mazibuko-Mbeje SE, **Jack B**. Therapeutic effects of curcumin and its synthetic derivatives: A computational perspective for antiobesity treatments. CHPC National Conference, Kruger National Park, South Africa, 4 - 7 December 2023. **Poster Presentation.**

TEACHING EXPERIENCE:

Medical Physiology Honours Programme, Stellenbosch University (BRIP cell culture training), 2017-2019, 2023.

POSTGRADUATE STUDENT SUPERVISION:

Current:

Mr. Rudzani Ramashia, MSc Medical Physiology student at the University of Stellenbosch.
Project Title: Investigating the efficacy of synthetic curcumin derivatives on skeletal muscle metabolism.

Mr. Marakiya Moetlediwa, MSc Biochemistry student at North-West University.
Project Title: Evaluating the efficacy of synthetic curcumin derivatives on adipocyte differentiation

and adipocyte dysfunction.

Mr. Khanyisani Ziqubu, PhD Biochemistry student at North-West University.
Project Title: Investigation of brown adipocyte secretome and the impact of natural flavonoids on batokines secretion involved in fat browning.

Graduated:

Ms Mokadi Mamushi, MSc Medical Physiology at the University of Stellenbosch.
Project Title: Investigating the ameliorative potential of *Aspalathus linearis* and *Cyclopia intermedia* against lipid accumulation, lipolysis, oxidative stress and inflammation.
Graduation date: 31 March 2020.

Ms Amina Parker, MSc Chemistry student at the University of the Western Cape.
Project Title: Anti-diabetic effects of Metformin derivatives.
Graduation date: 9 September 2022.