



UNIVERSITEIT•STELLENBOSCH•UNIVERSITY  
jou kennisvenoot • your knowledge partner

# Immune-endocrine Interactions in Type 2 Diabetes During Latent and Active TB

**Katharina Ronacher**

*Associate Professor*

*Stellenbosch University Immunology Research Group (SUN-IRG), Division of Molecular Biology and Human Genetics, Faculty of Health Sciences, Stellenbosch University, South Africa.*



Departement Gesondheidswetenskappe

Faculty of Health Sciences



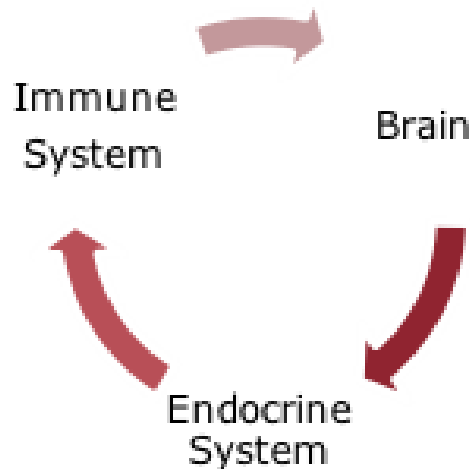


## The link between the immune and endocrine system



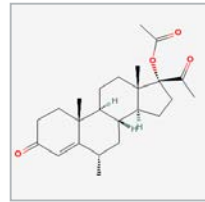
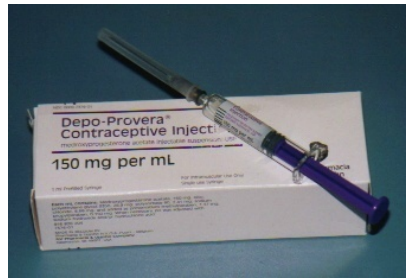
- Hormone receptors are expressed on immune cells
- Structural similarity between cytokine and hormone receptors
- Hormones are produced by cells of the immune system

ACTH is produced by lymphocytes and binding of CRH to lymphocytes stimulates ACTH production.

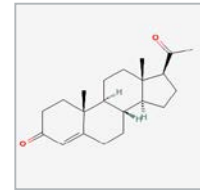




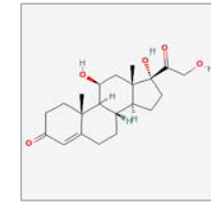
# Hormones can affect immune function



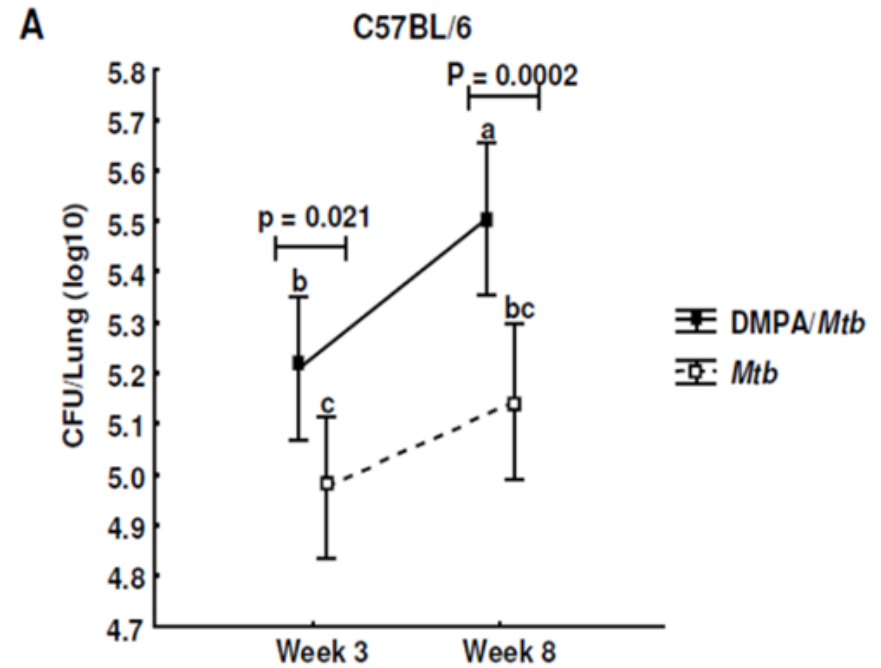
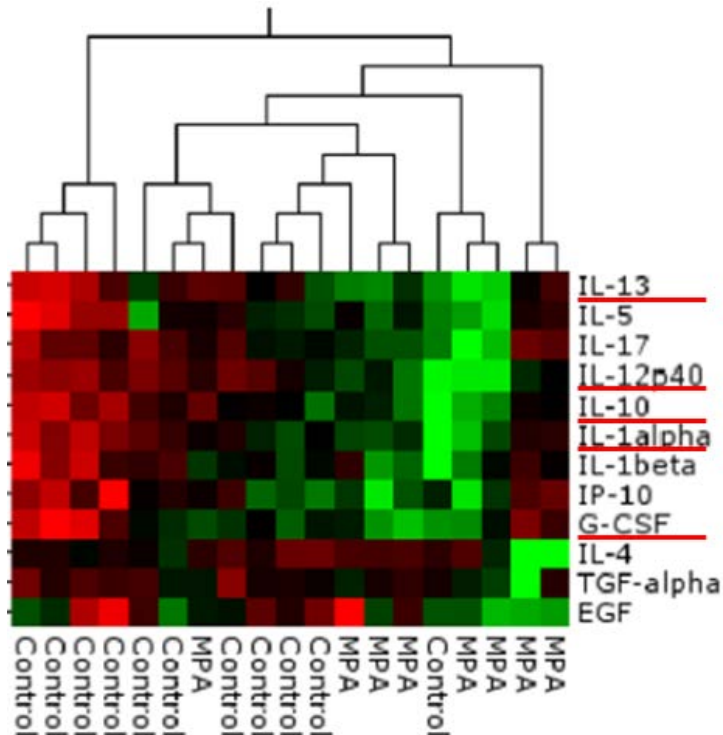
MPA



Progesterone

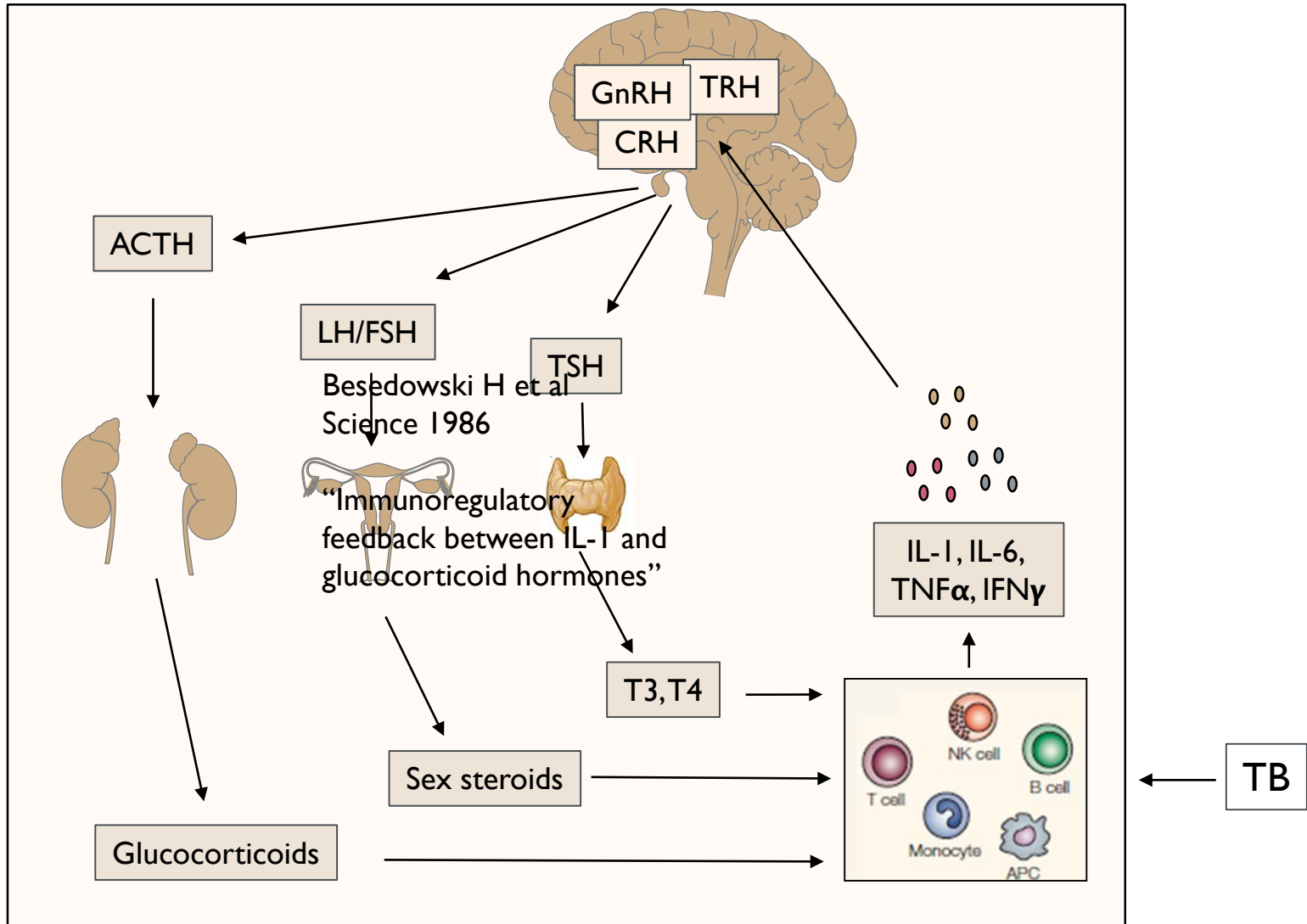


Cortisol



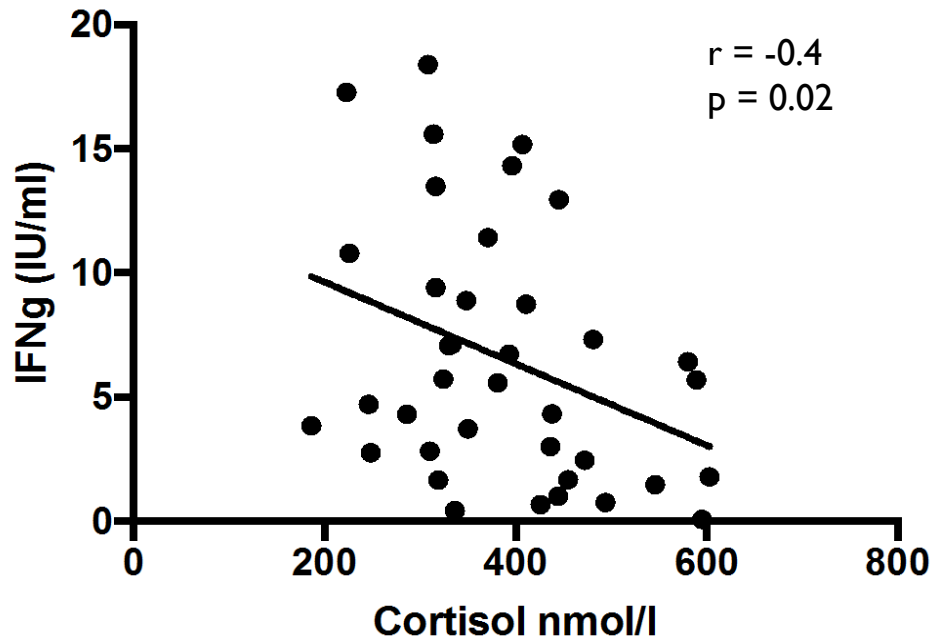


# How can TB infection/disease affect the endocrine system?



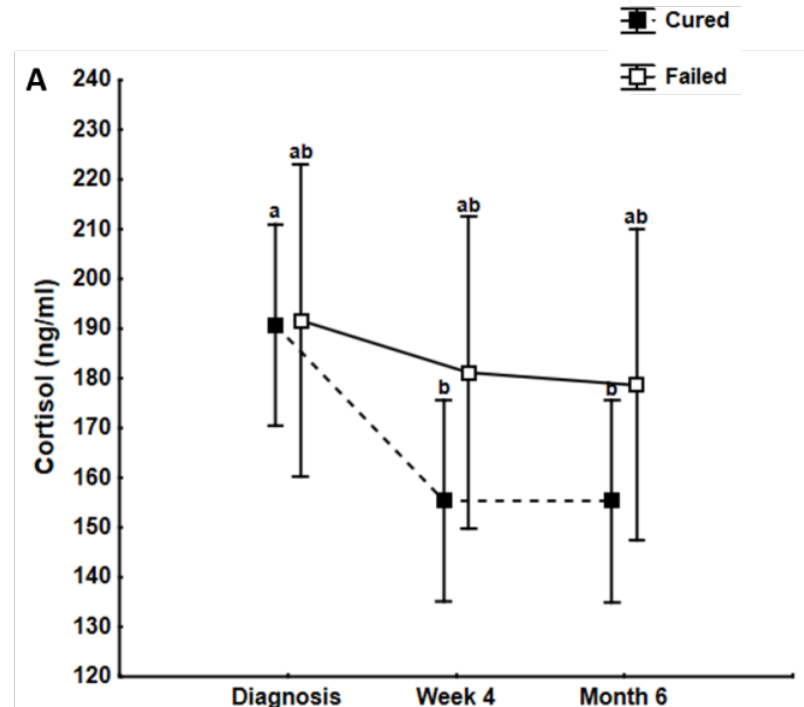
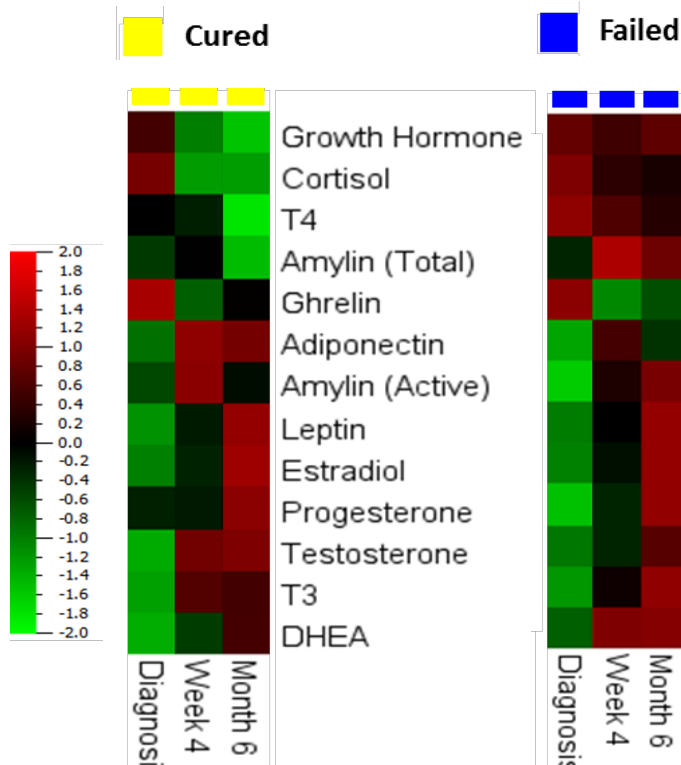


# IFN<sub>γ</sub> secretion negatively correlates with serum cortisol concentrations in LTBI





# Endocrine changes during active TB and TB treatment



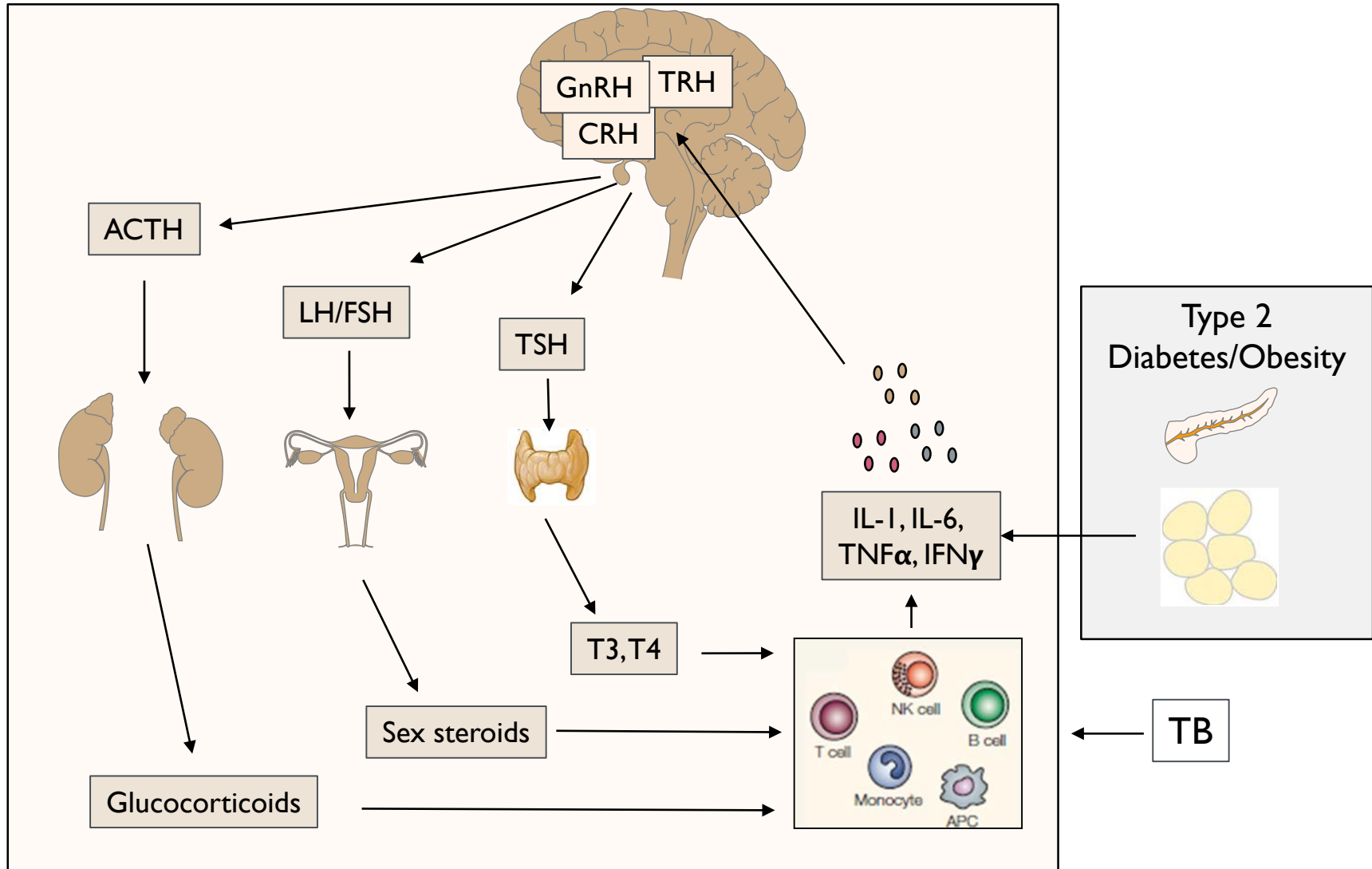
**Table 1:** Characteristics of study groups.

	Cured (n = 27)	Failed (n = 10)	p-value
<b>Age (years)*</b>	35.0 ± 10.42	38.6 ± 11.9	0.44
<b>Sex (F/M)</b>	14/13	5/5	
<b>BMI (kg/m<sup>2</sup>)*</b>	18.1 ± 0.4	18.8 ± 0.7	0.33
<b>CXR score*</b>	57.6 ± 6.3	71.7 ± 11.3	0.31

\*Results are shown as mean ± SD. F: female, M: male, BMI: body mass index, CXR: chest X-ray

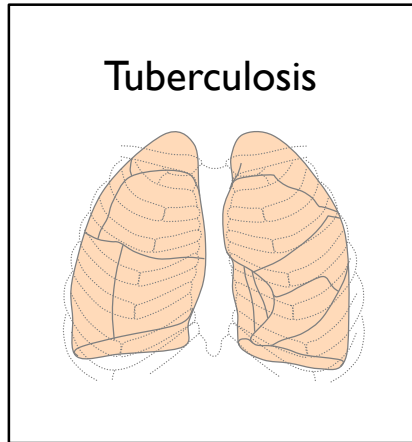


# Can chronic inflammation influence the HP axis?

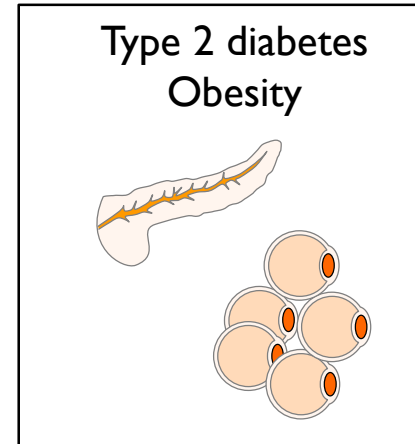
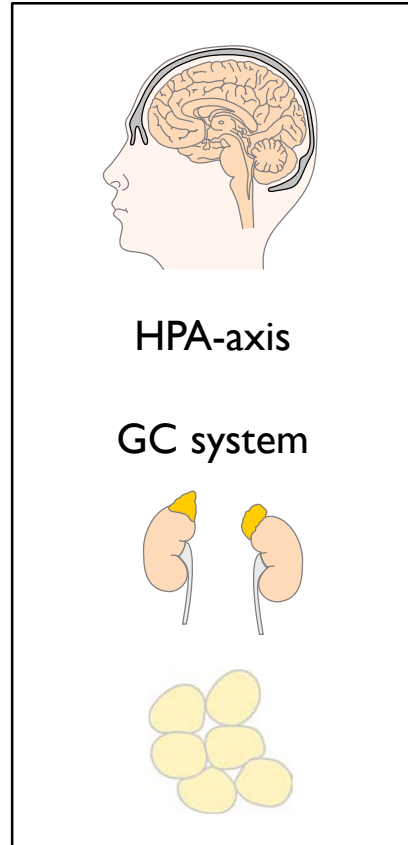




# TB and Diabetes lead to changes in the GC system



- ↑ cortisol
- ↑ transient hyperglycaemia
- ↑ GR $\beta$  – GC resistance

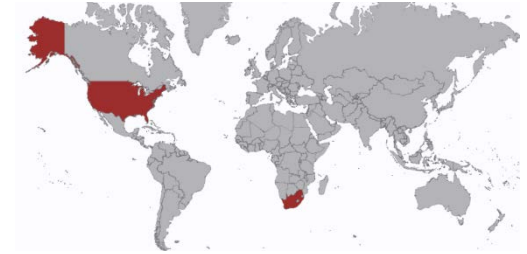
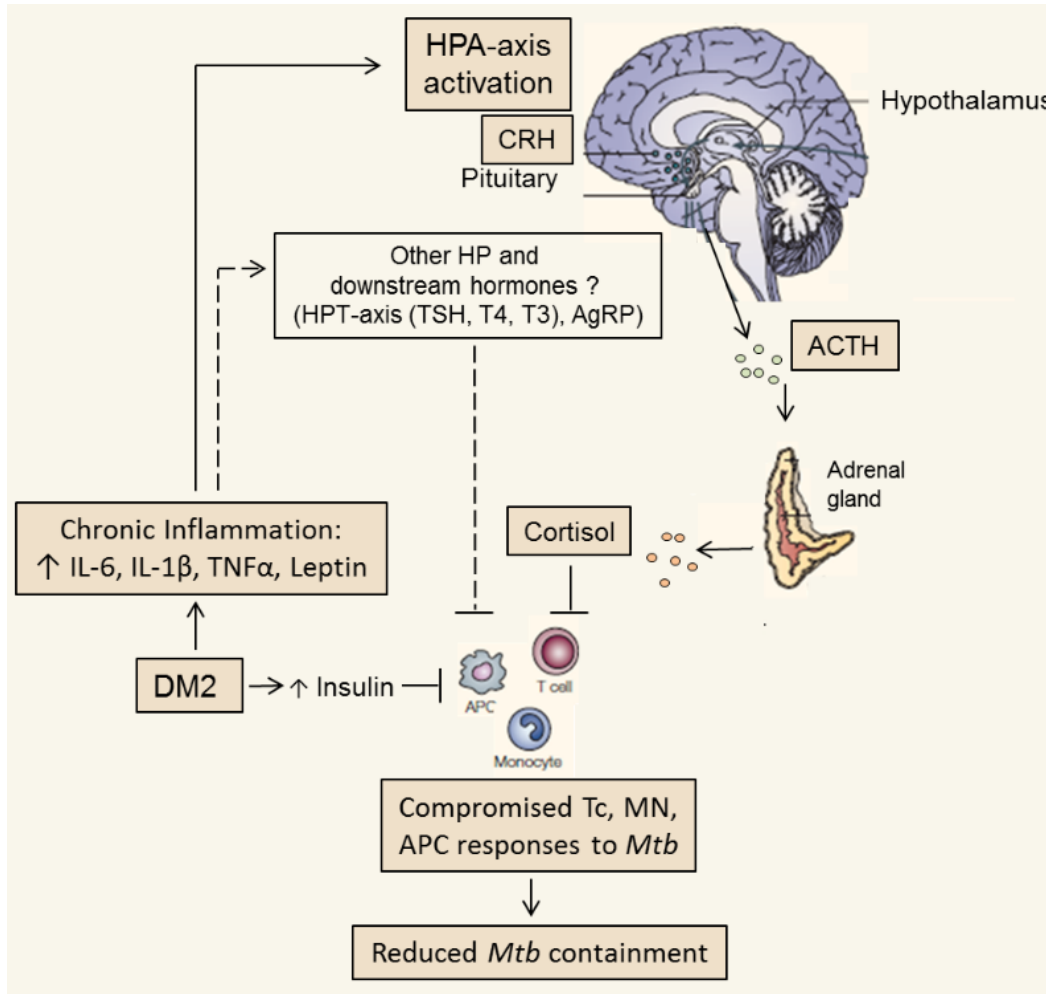


- ↑ cortisol HPA (?)
- ↑ cortisol periphery (11 $\beta$ -HSD I)
- ↑ GR $\beta$  – GC resistance





## Altered Endocrine Axis in Type 2 Diabetes and Risk for Tuberculosis



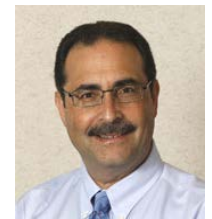
Katharina Ronacher  
Stellenbosch University



Blanca Restrepo  
University of Texas



Gerhard Walz  
Stellenbosch University



Larry Schlesinger  
Ohio State University



- Interdisciplinary approach to fight the TB-T2DM co-epidemic
  - ▶ TB is more than an infectious lung disease
  - ▶ T2DM is a complex disorder
  
- New therapeutic opportunities, host directed therapies
  - ▶ DHEA derivatives



# Acknowledgements



## My team:



Leanie Kleynhans  
(Senior Researcher)



Carine Kunsevi-Kilola  
(PhD student)



Happy Tshivhula  
(PhD student)



Jessica Klazen  
(MSc student)



Mosa Selamolela  
(MSc student)



Nicole Prins  
(Research Assistant)



Ayanda Shabangu  
(BSc hons student)

## SUN Immunology Research Group

**Gerhard Walzl**

Clinical and staff and all other SUN-IRG members

## Collaborators (TB-DM related studies)

### TANDEM

**Hazel Dockrell**, London School of Hygiene and Tropical Medicine

**Reinout van Crevel**, Radboud University Medical Center

**Julia Critchely**, St. George's University, London

### ALERT

**Blanca Restrepo**, University of Texas

**Larry Schlesinger**, Ohio State University

**Magda Conradie**, Stellenbosch University

## Funders



National  
Research  
Foundation

