

# **Exploring WGCNA Analysis on the Study Explorer**

**A new feature on VEuPathDB**

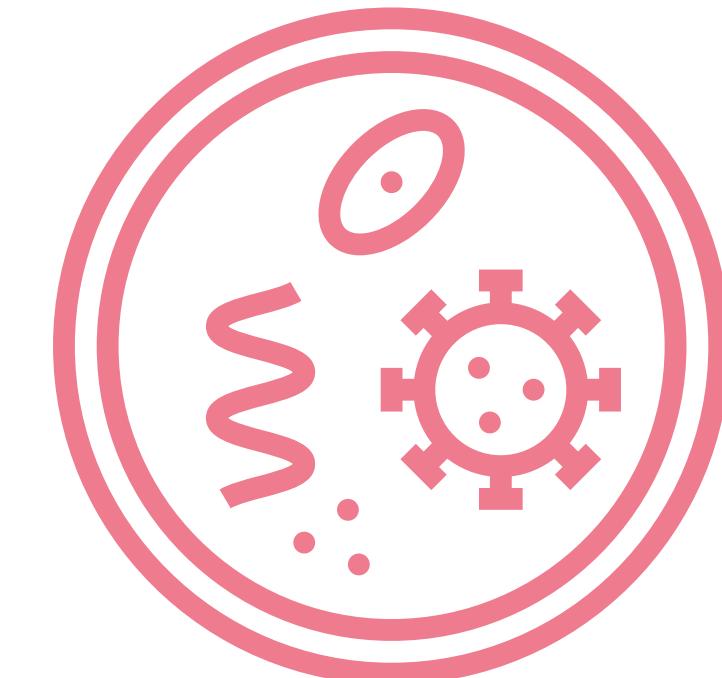


# **Most infectious disease studies focus on either host or pathogen**

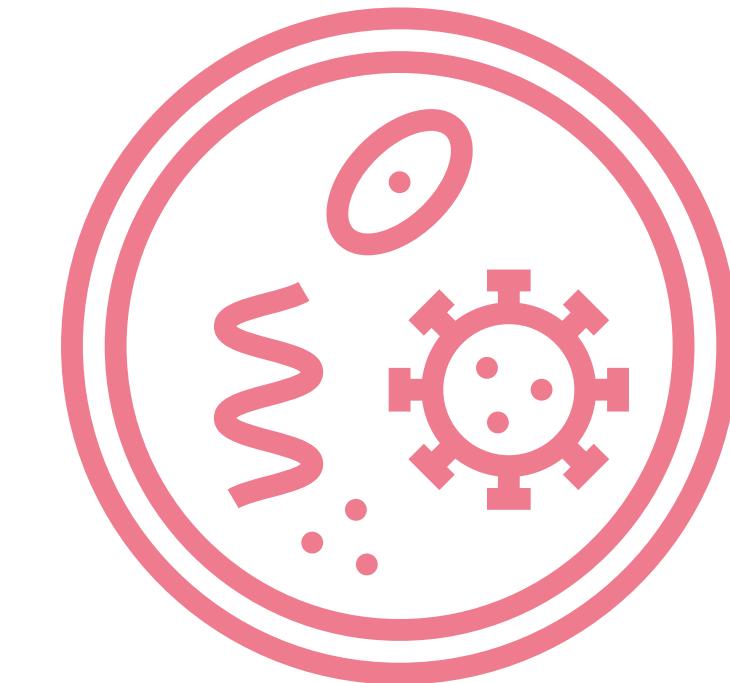
**Infectious disease  
in hosts**



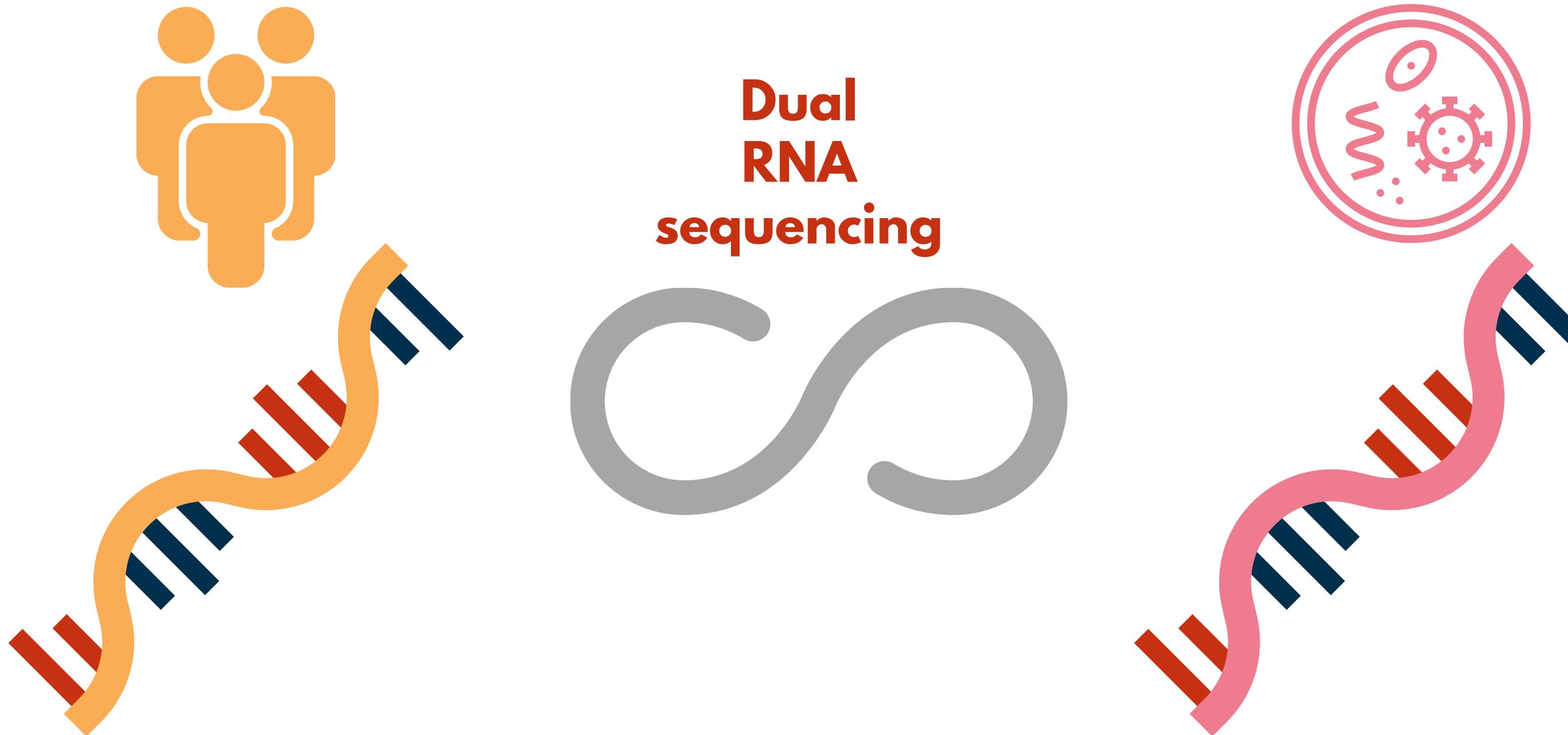
**Infectious disease  
pathogens**



# **But disease outcomes are determined by host pathogen interaction**



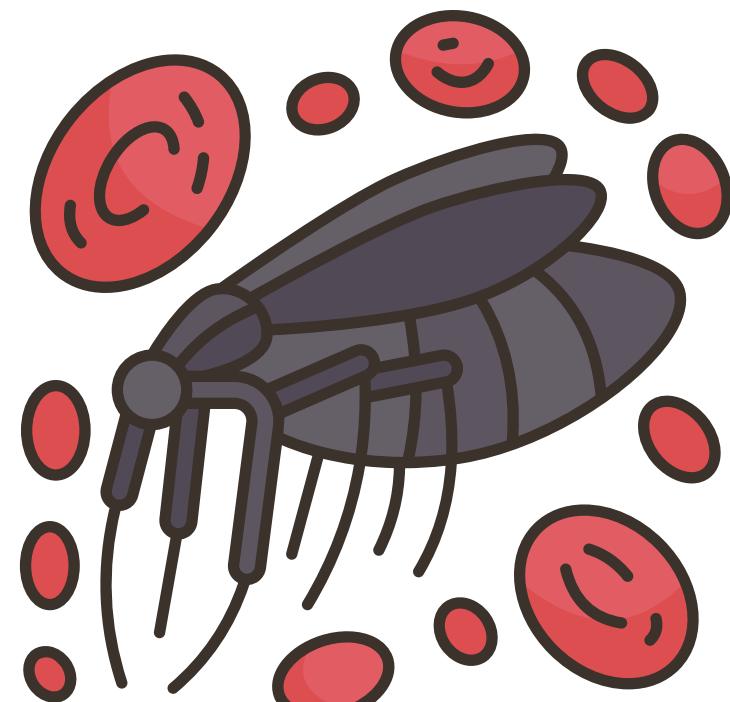
# Host- Pathogen Interactions



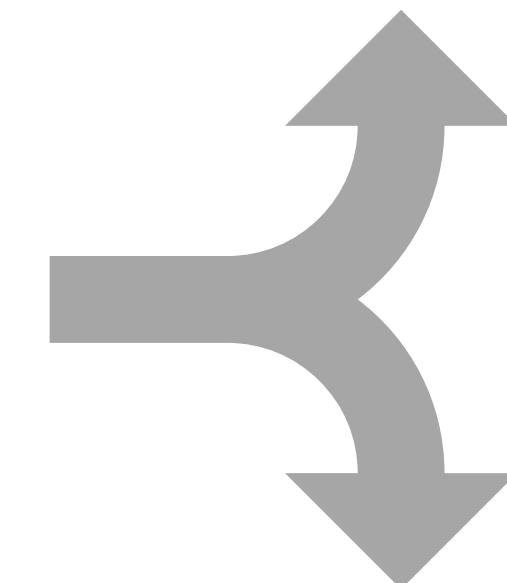
# Host Pathogen Interactions

## Severe Malaria in Children

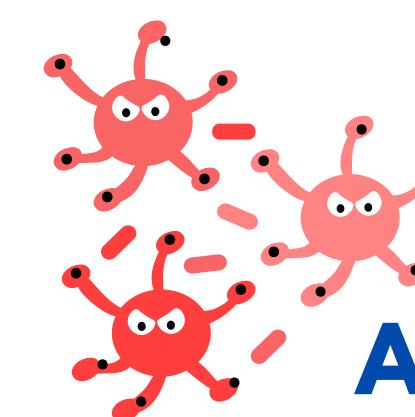
Lee et. al (2018)



Uncomplicated malaria



Severe malaria

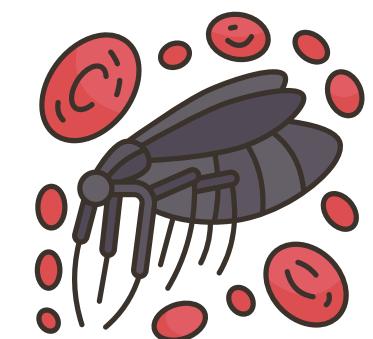


Aberrant host  
immune response?

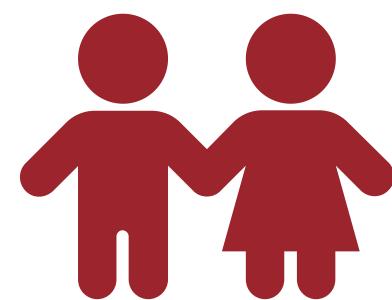
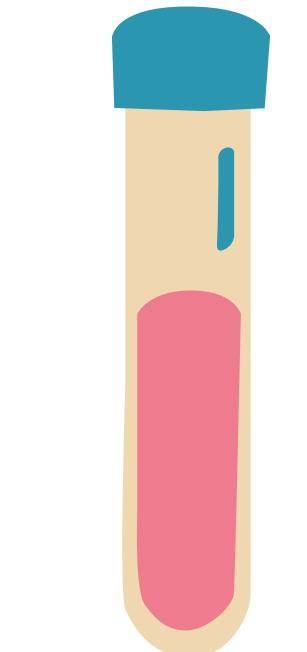
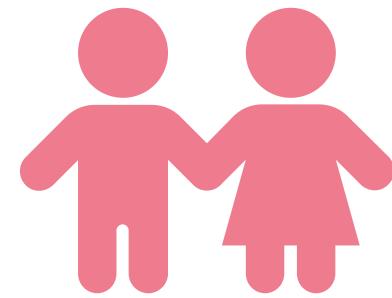
# Dual Transcriptomic Analysis



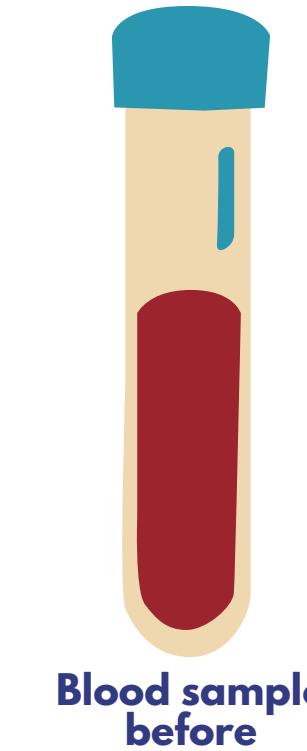
The  
**Gambia**



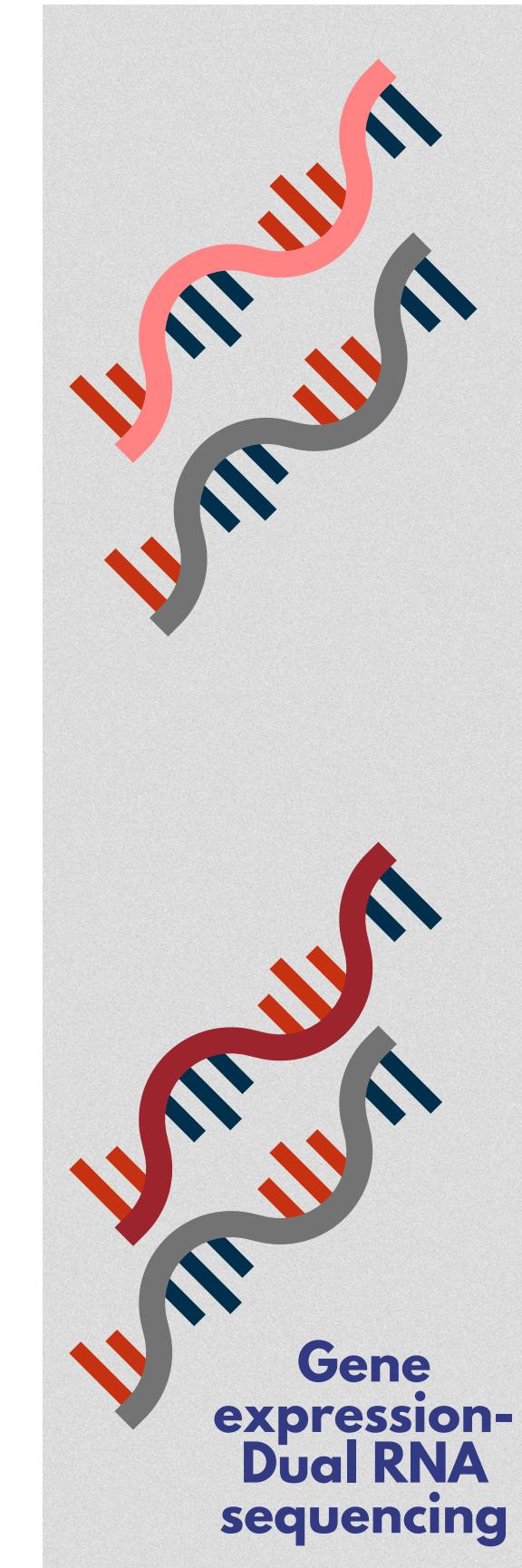
n=21  
**uncomplicated  
malaria**



n=25  
**severe malaria**



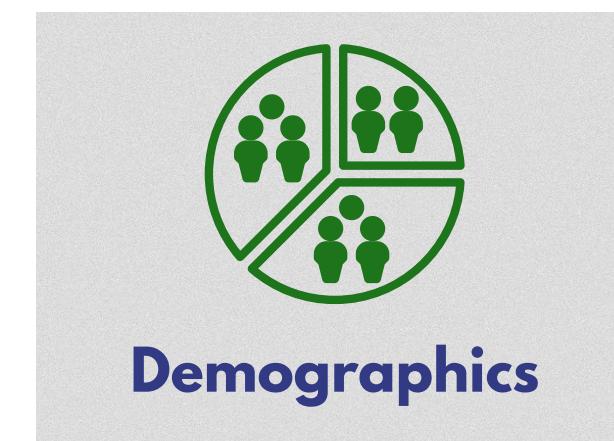
Blood sample  
before  
treatment



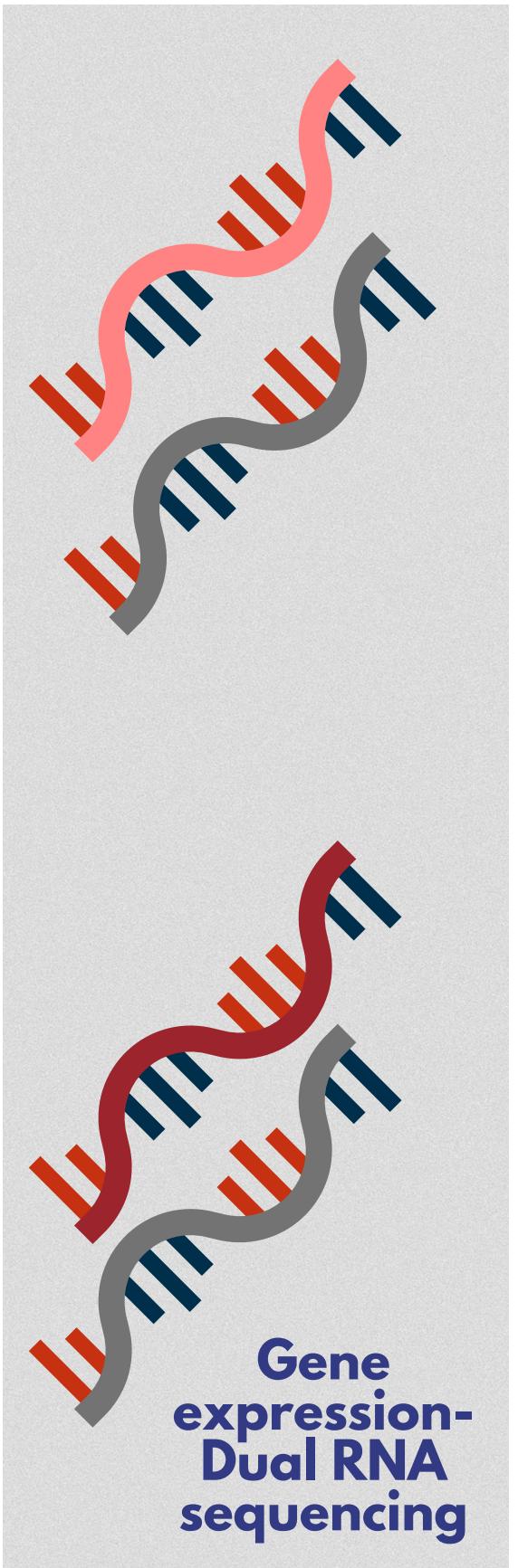
Clinical and  
lab data



Parasite load

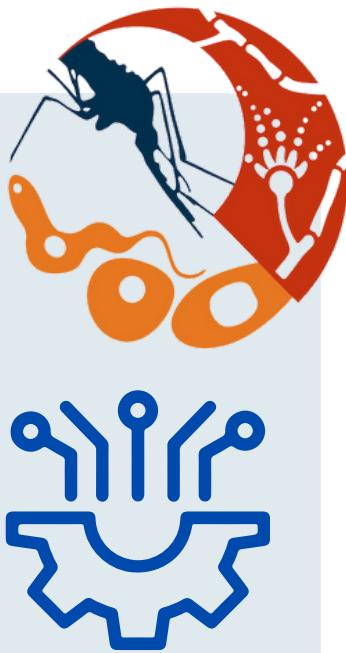


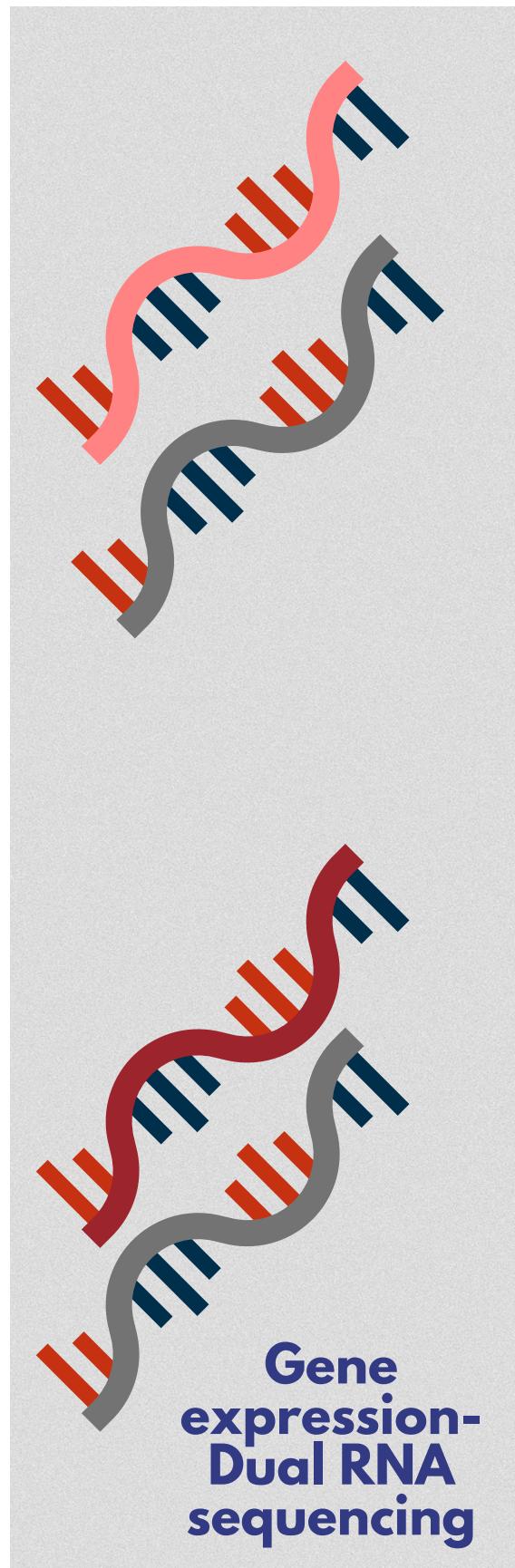
Demographics



# WGCNA

## Weighted Gene Co-Expression Network Analysis





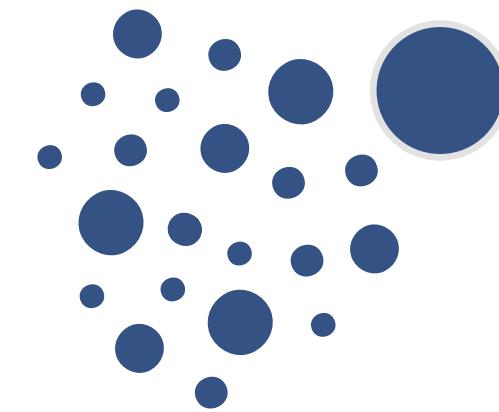
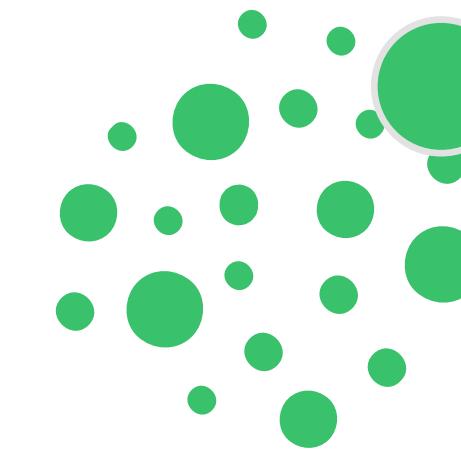
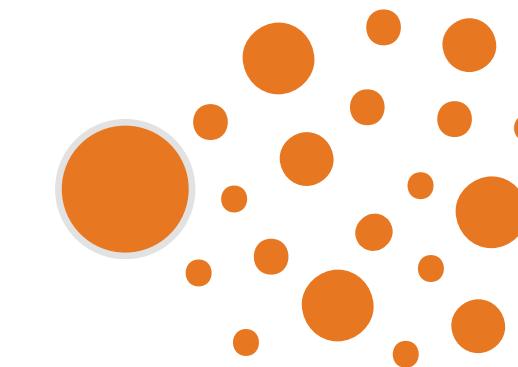
## WGCNA

### Weighted Gene Co-Expression Network Analysis



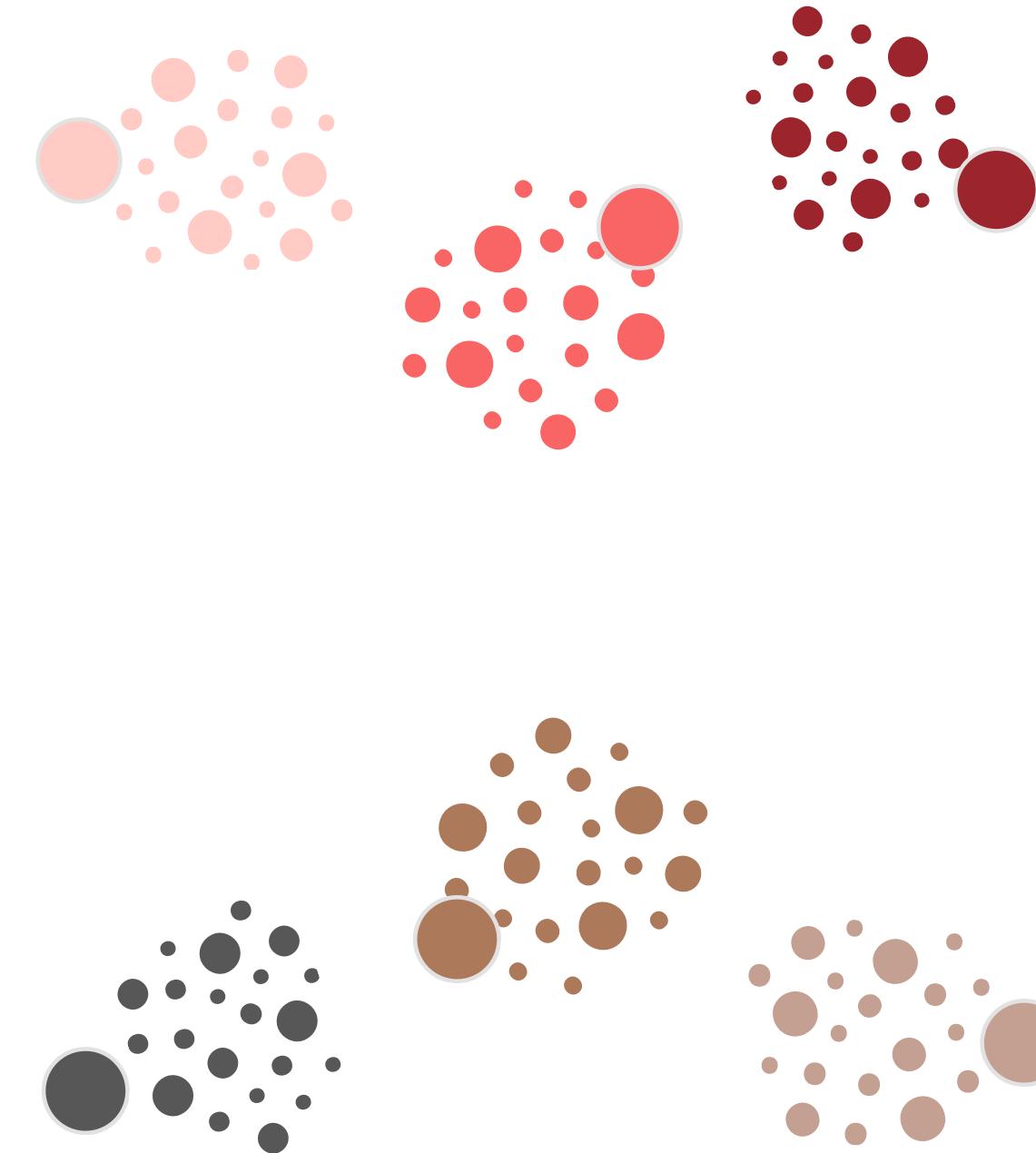
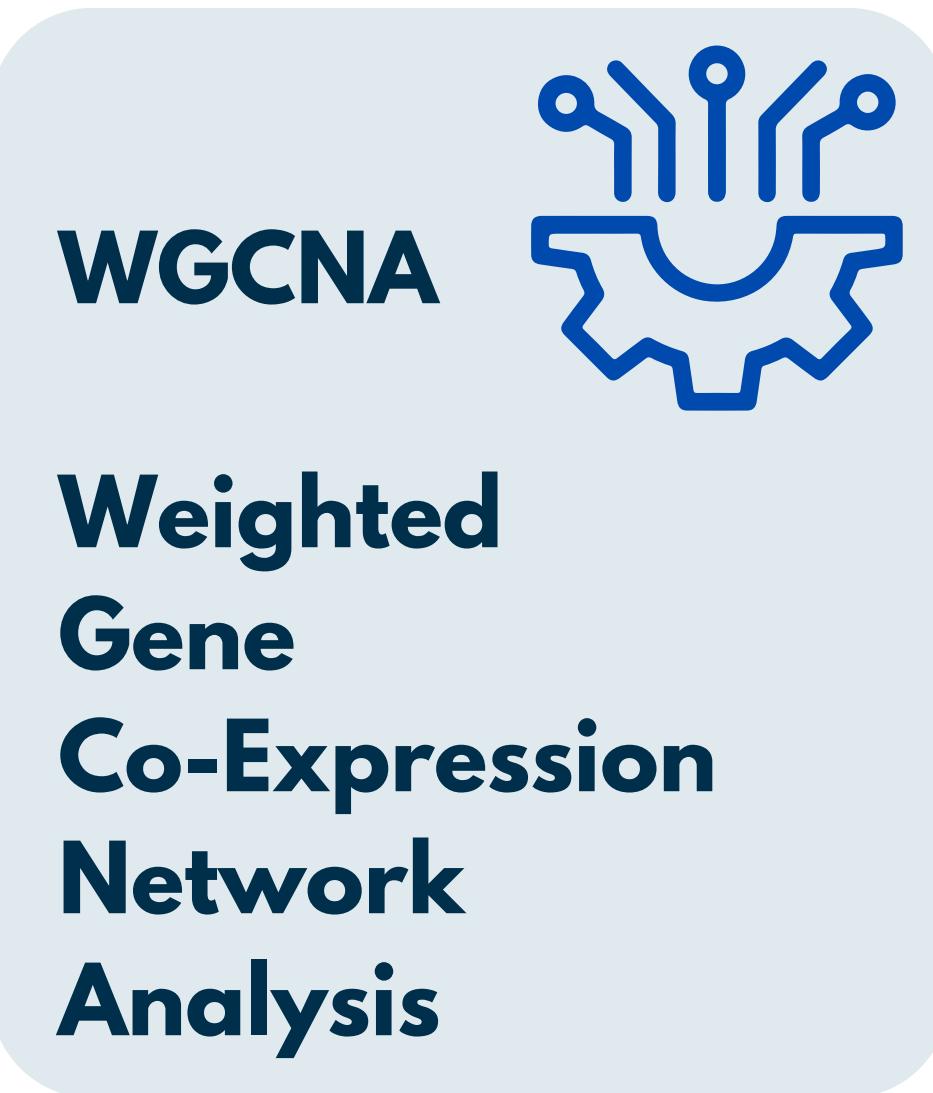
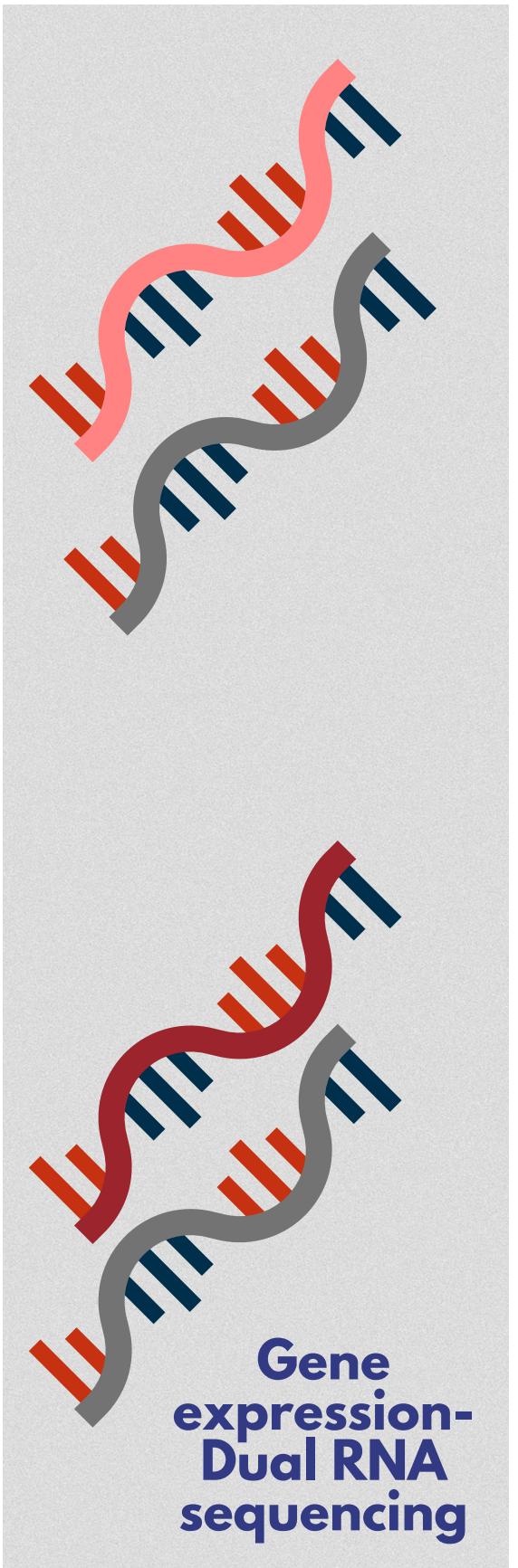
## Modules

Groups of genes with similar expression profiles across samples



Eigengene  
Imaginary gene  
representing the module

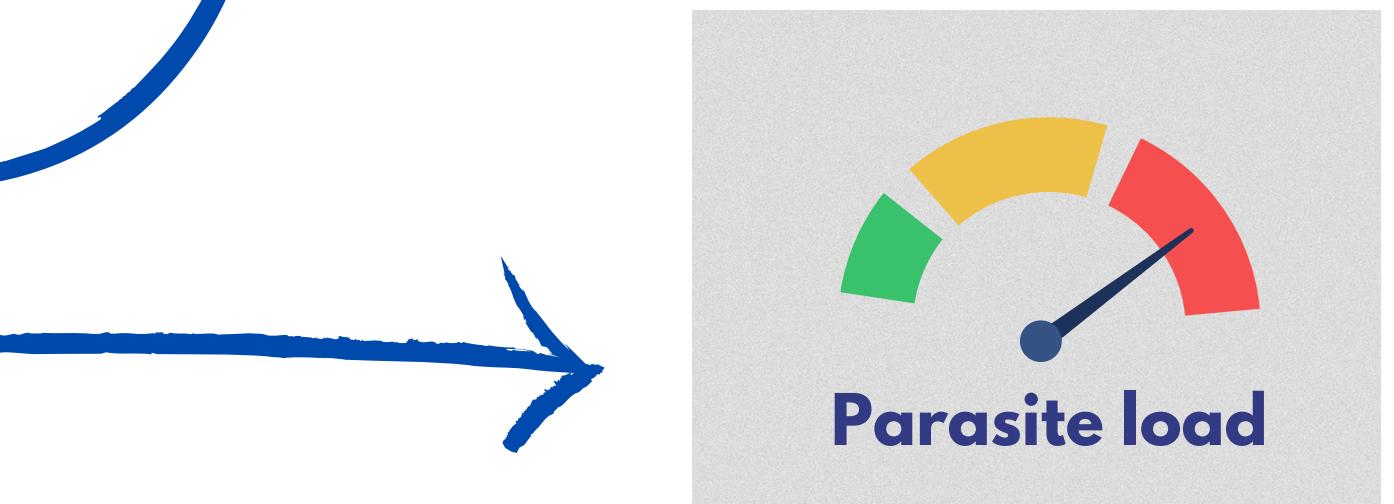
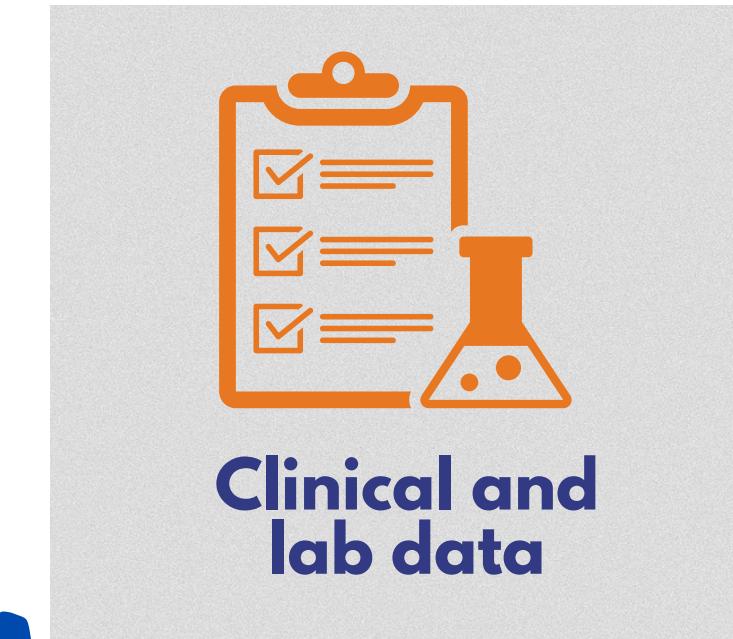
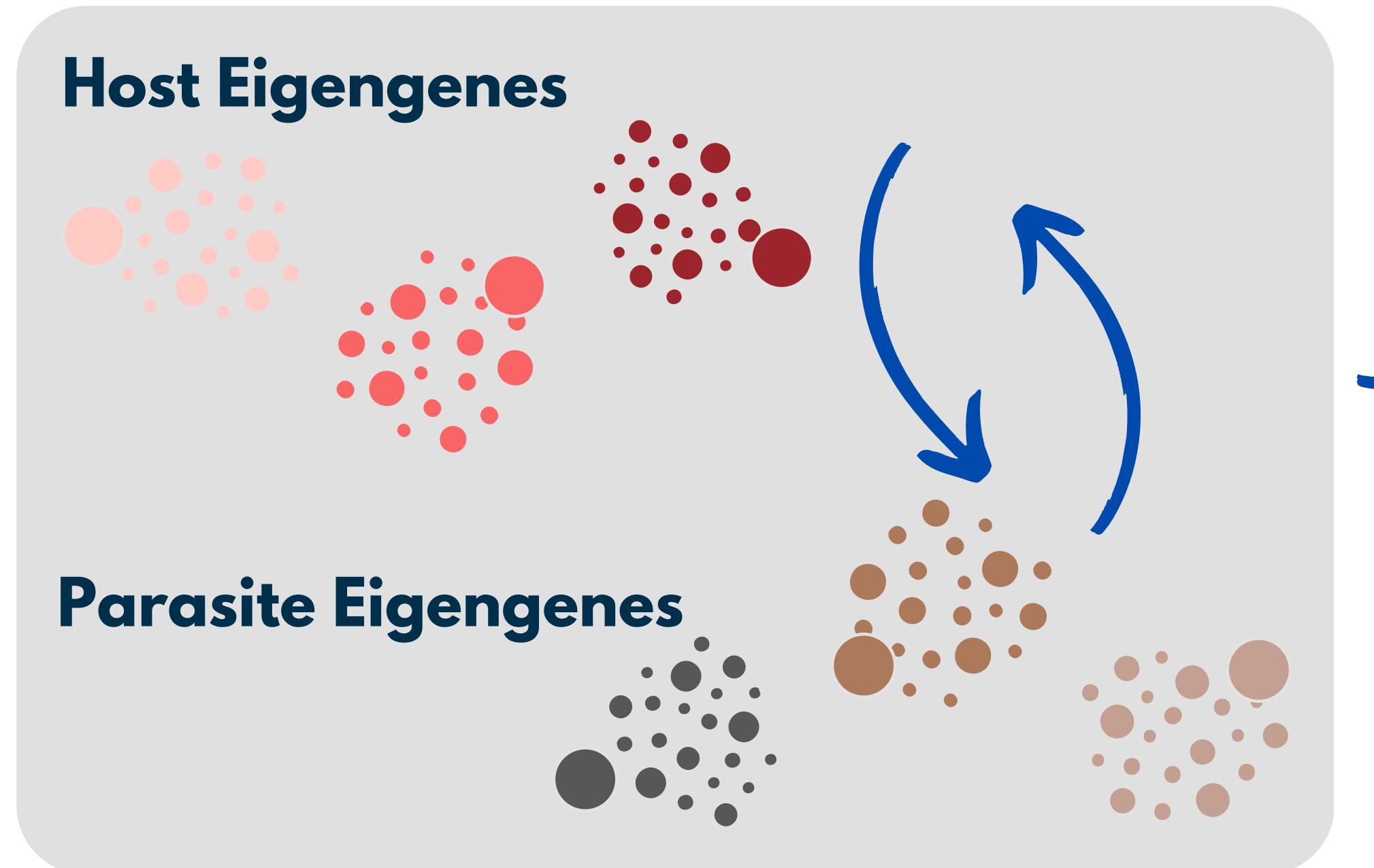




**Host  
Eigengenes**

**Parasite  
Eigengenes**

# We have a lot of data in hand!



# The VEuPathDB Study Explorer

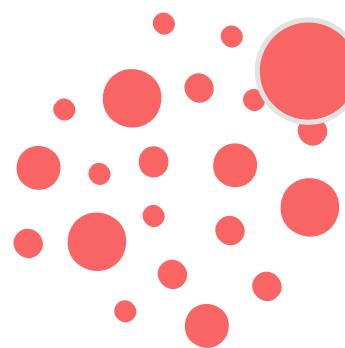


The screenshot shows the VEuPathDB Study Explorer interface. At the top, there's a navigation bar with the PlasmoDB logo, search bar, and various links like 'My Strategies', 'Searches', 'Tools', etc. Below the header, the title 'Study Explorer' and subtitle 'Dual transcriptomes of malaria-infected Gambian children (Study Explorer)' are displayed. A 'New Analysis' button and 'My Analyses' link are also present. The main content area shows a flowchart of data sources: 'Sample sources 46 of 46' → 'Samples 46 of 46' → 'Assays 46 of 46'. Below this, there are tabs for 'View Study Details', 'Browse and Subset' (which is selected), 'Visualize', 'Download', 'Record Notes', and 'Learn'. A sidebar on the left lists variables: Sample source (Age, Ethnicity, First Blantyre coma score, Malaria disease, Participant ID, Sex), Sample, and Assay. A histogram titled 'Age (years)' shows the distribution of sample ages, with the x-axis ranging from 0 to 14 years and the y-axis showing the count of samples. The histogram bars are red, and the legend indicates 'Subset of Sample sou...' and 'All Sample sources'. The 'Age' variable is highlighted in the sidebar.



## Visualize correlation

- Eigengenes with parasite load
- Eigengenes with clinical data
- Host eigengenes with parasite eigengenes



Pick an eigengene of interest and search the genes belonging to that module