

## 1. Project Details

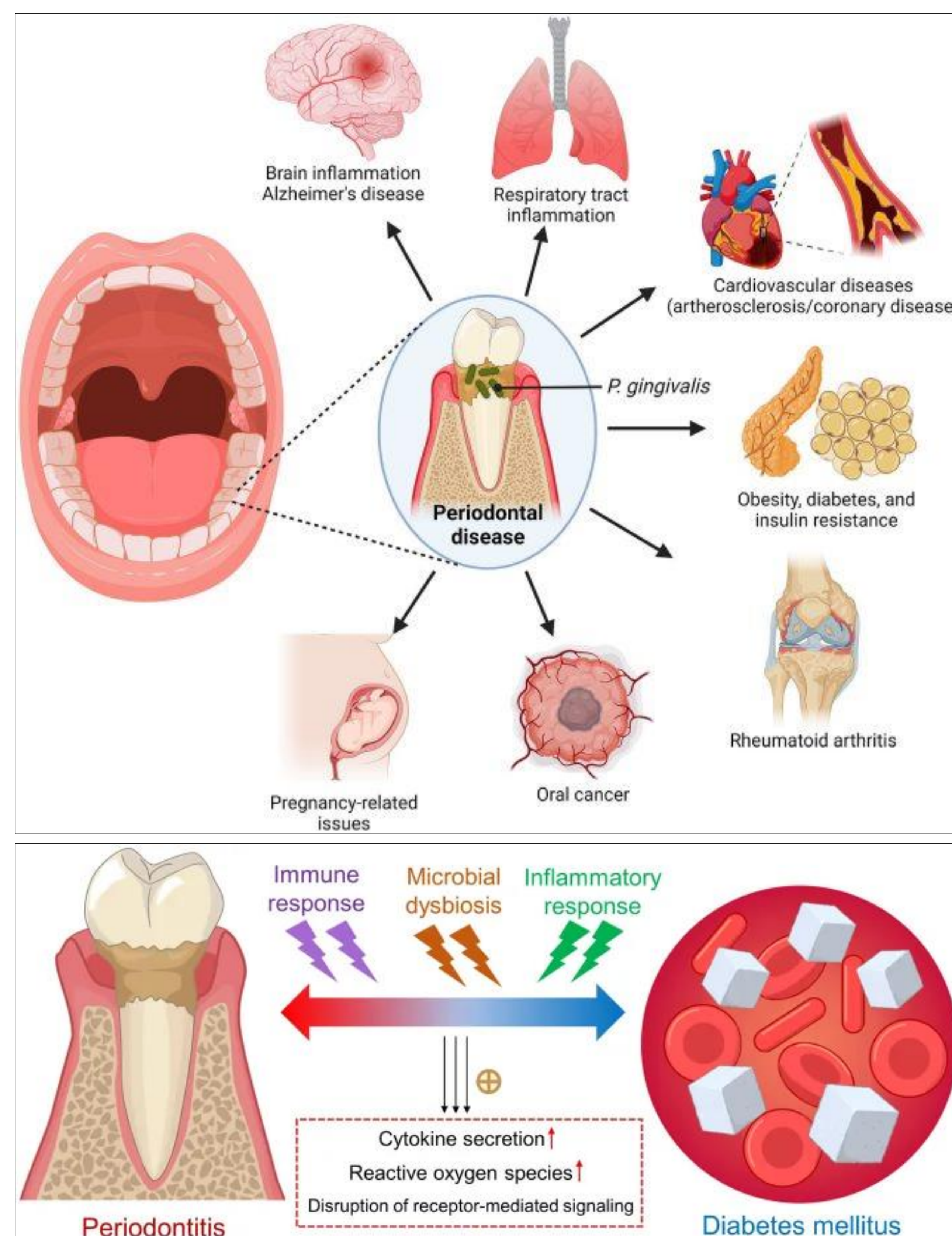
**Objective:** To evaluate the association between periodontitis and metabolic as well as hepatic biomarkers in an adult cohort, and to determine whether these relationships differ by diabetes status.

**Methods:** A retrospective analysis was conducted using de-identified electronic health record data from 236 adults (137 with periodontitis; 99 without). Demographic variables and metabolic biomarkers—including hemoglobin A1c (HbA1c), fasting glucose, triglycerides, TyG index, lipid ratios (LDL/HDL, TG/HDL), and liver enzymes (AST, ALT)—were analyzed. Continuous variables were assessed for normality and compared using independent t-tests or Mann-Whitney U tests as appropriate; categorical variables were compared using chi-square tests. Multivariable logistic regression was performed to assess independent associations between biomarkers and periodontitis after adjusting for age and sex. Collinearity diagnostics were conducted, and derived indices were retained in final models. Analyses were stratified by diabetes status.

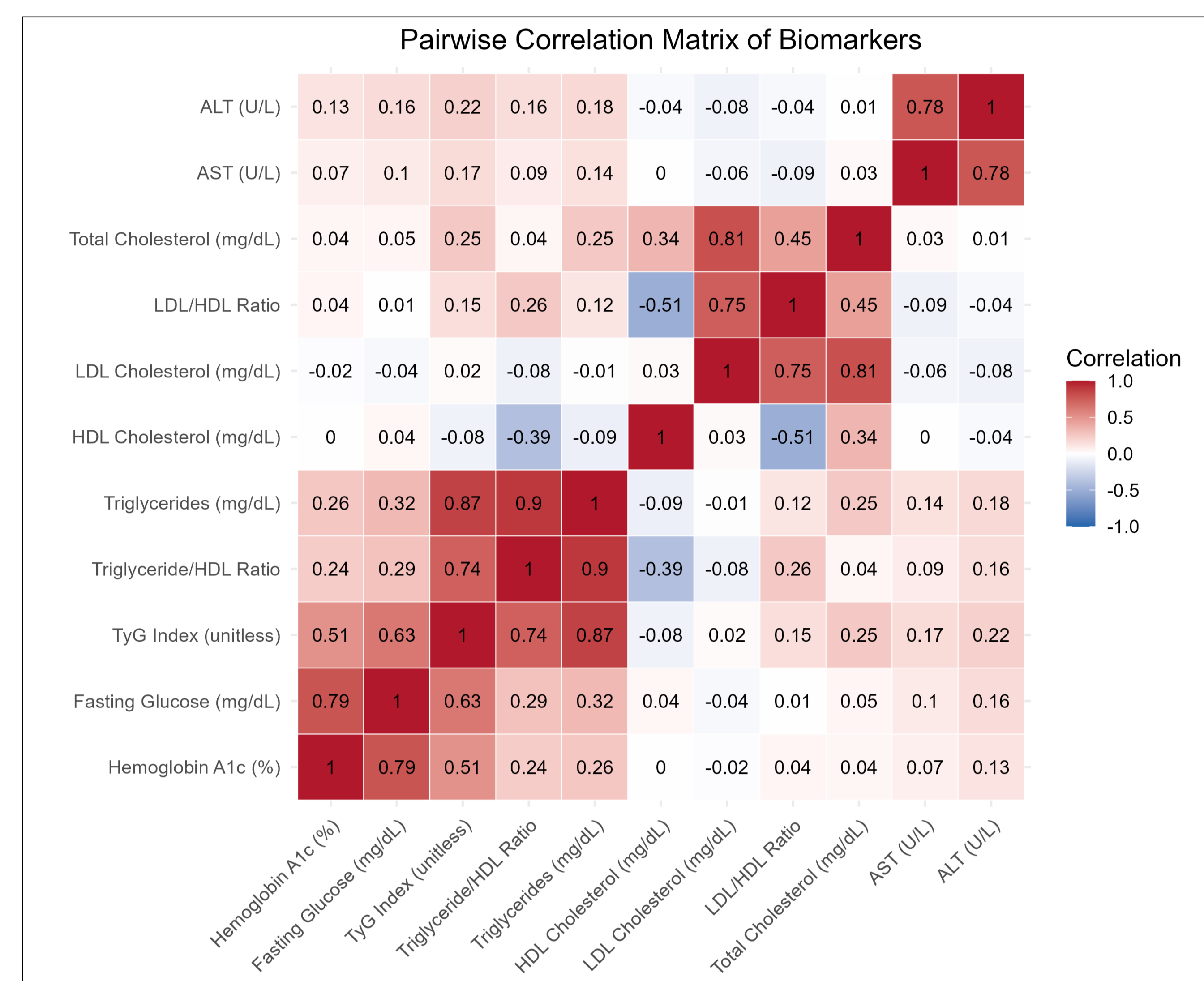
**Results:** In the overall sample, most metabolic biomarkers did not differ significantly between participants with and without periodontitis. However, diabetes prevalence differed between groups ( $p = 0.034$ ). Among diabetic individuals ( $n = 64$ ), those with periodontitis demonstrated significantly higher HbA1c ( $p = 0.019$ ) and AST levels ( $p = 0.031$ ) compared to diabetics without periodontitis. In multivariable analysis, AST remained independently associated with periodontitis among diabetic participants (OR 1.15; 95% CI 1.001–1.33;  $p = 0.048$ ). No independent associations were observed in the non-diabetic subgroup.

**Conclusions:** Periodontitis was associated with poorer glycemic control and elevated hepatic transaminase levels among adults with diabetes. These findings suggest a potential hepatic-inflammatory link in diabetic individuals with periodontal disease and underscore the importance of integrated dental and medical risk assessment in this high-risk population.

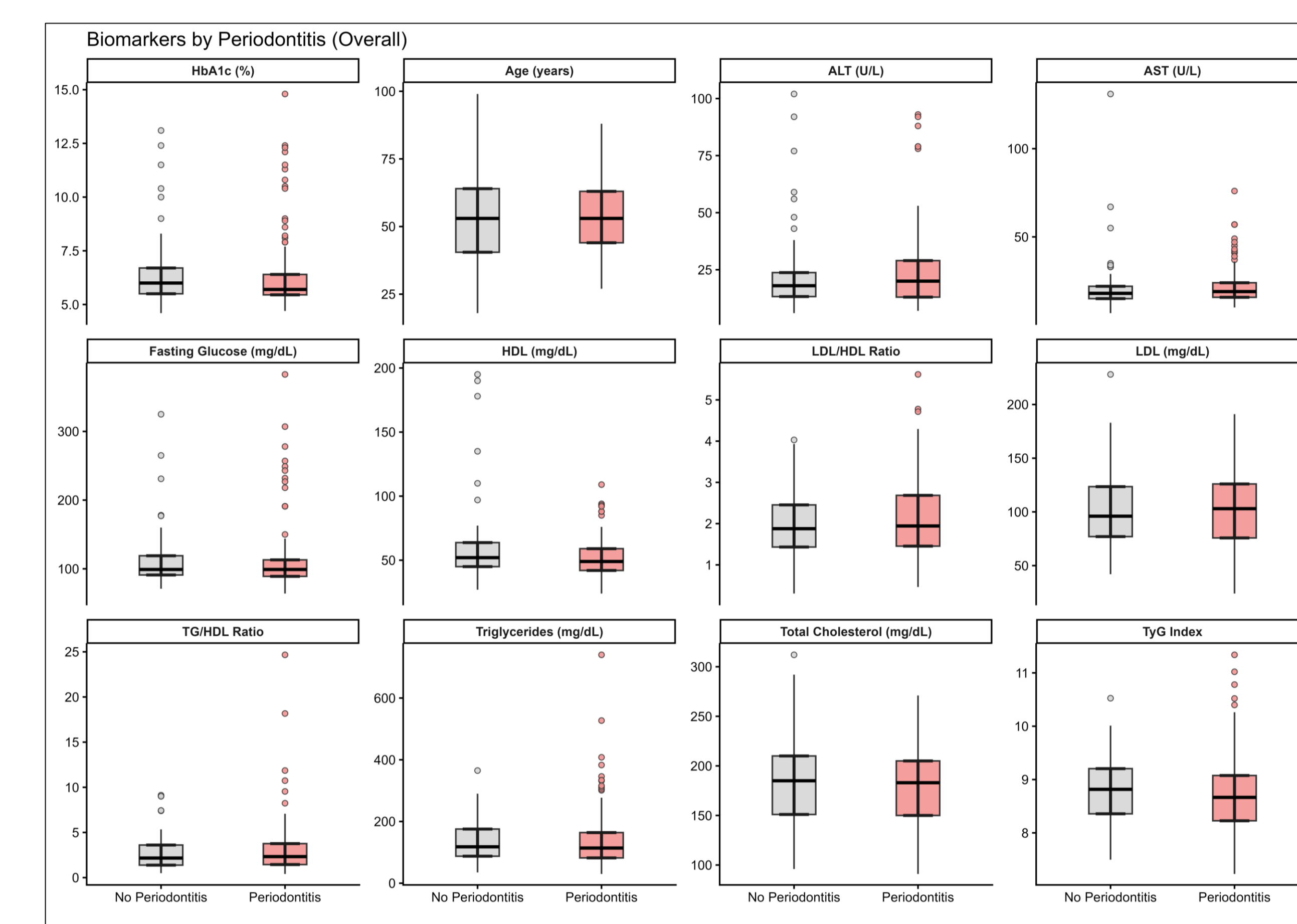
## 2. The Interrelationship between Periodontal Disease and Systemic Health



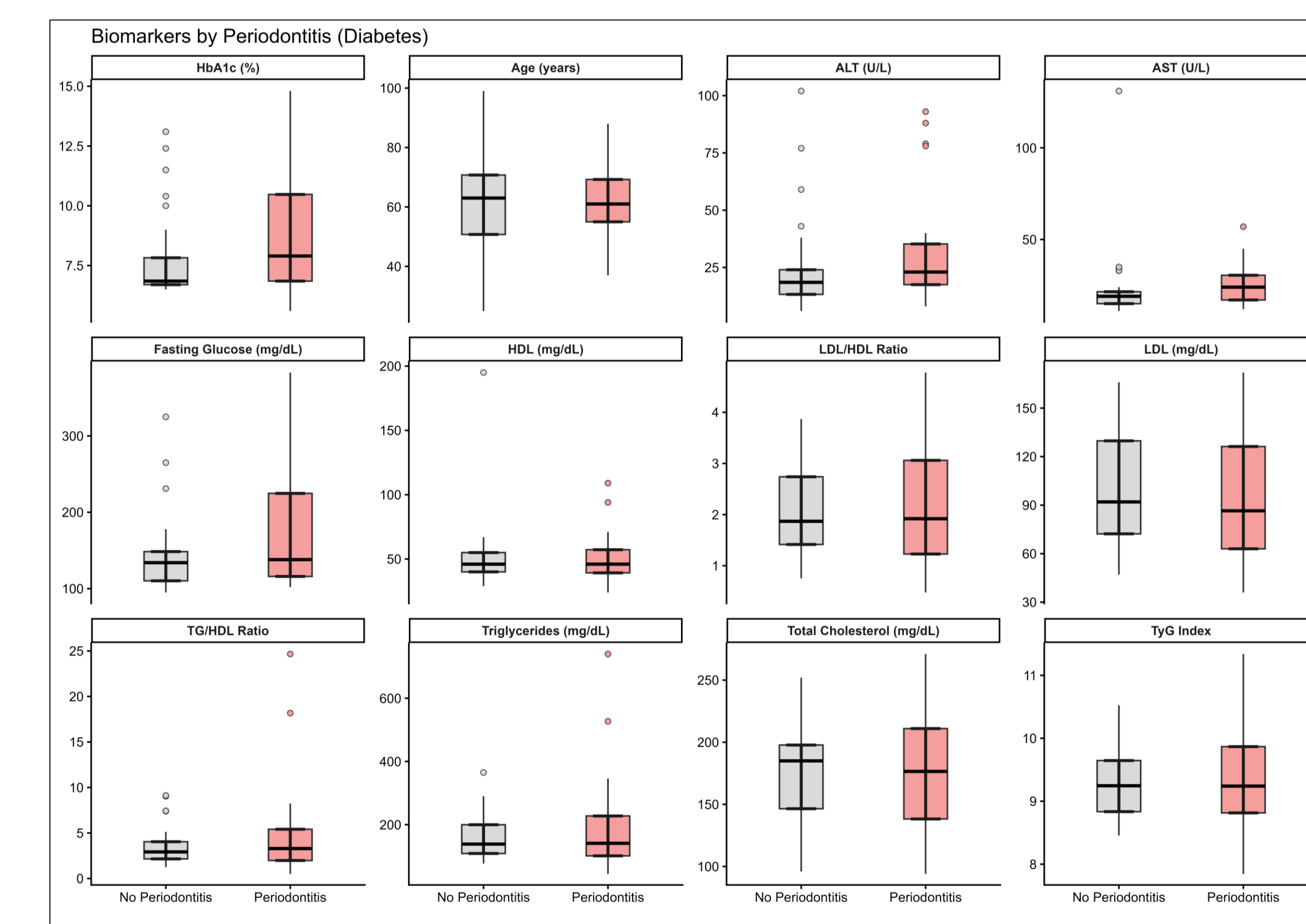
## 3. Correlation Structure of Metabolic Biomarkers



## 5. Overall Comparison: Periodontitis vs Non Periodontitis



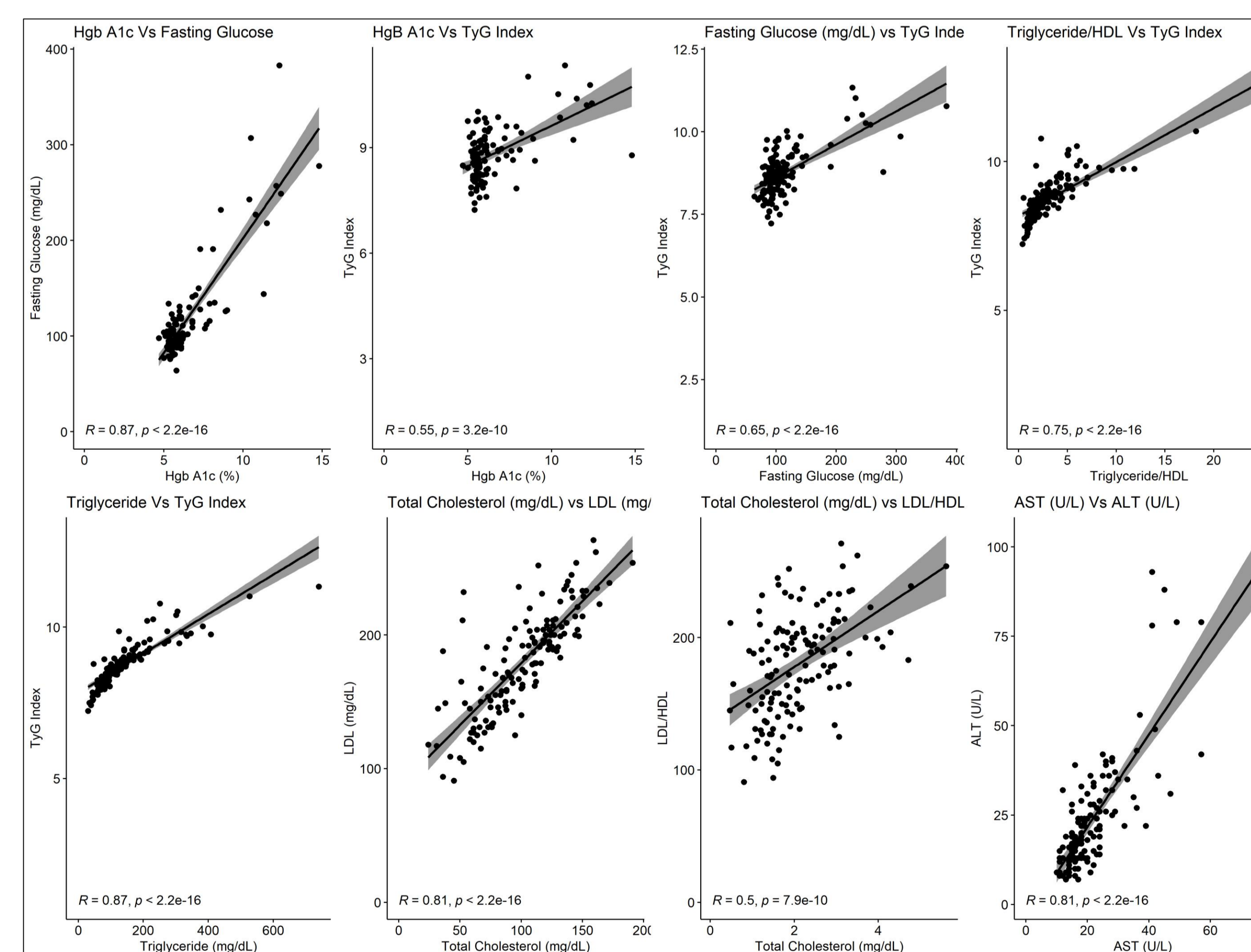
## 6. Diabetic Subgroup: Periodontitis vs Non Periodontitis



## 7. Summary

- Metabolic biomarkers were interrelated across glycemic, lipid, and hepatic pathways in the full cohort.
- While periodontitis was not independently associated with metabolic markers overall, diabetic individuals with periodontitis demonstrated significantly higher HbA1c and AST levels.
- Elevated AST remained independently associated with periodontitis among diabetic participants after adjustment for demographic factors.
- These results support a potential hepatic-inflammatory link in diabetic patients with periodontal disease and underscore the need for interdisciplinary screening strategies.

## 4. Multivariable Logistic Regression



## Funding