Urinary Biomarkers for Predicting Pancreatic Cancer

Lisa J.B. Hu (414264)
Bioinformatics - BFV3
Institute of Life Sciences & Technology
Hanze University of Applied Sciences
Dave Langers
Bart Barnard
October 5, 2022

Urinary Biomarkers for Pancreatic Cancer

Lisa Hu
414264
Bio-Informatics
Hanzehogeschool Groningen, ILST
Dave Langers (LADR) & Bart Barnard (BABA)
October 5, 2022

Preface

Abstract

List of Abbreviations

- **PDAC**: Pancreatic ductal adenocarcinoma
- **SN**: sensitivity
- **SP**: specificity

Contents

1 Introduction

https://www.gov.uk/government/statistics/cancer-survival-in-england-for-patients-diagnosed-between-2014-and-2018-and-followed-up-until-2019/cancer-survival-in-england-for-patients-diagnosed-between-2014-and-2018-and-followed-up-to-2019

2 Methods

3 Results

3.1 Demographics

The patients were divided by diagnosis and the PDAC patients are further seperated by the stage of the disease. The number of samples per diagnosis and stage are shown in Tables 1 and 2.

Sample type	**Control**		**Benign**		**PDAC**		
	Sample	Sex	Sample	Sex	Sample	Sex	Cancer stage
Urine (n=590)	183	F = 115 M = 68	208	F = 101 M = 107	209	F = 83 M = 116	I-IIA = 27 II-IIB = 75 III = 76 IV = 21
Plasma (n=350)	92	F = 58 M = 34	108	F = 57 M = 51	150	F = 86 M = 64	I-IIA = 20 II-IIB = 60 III = 65 IV = 5

Table 1: Demographics of the samples

3.2 REG1B outperforms REG1A in detecting early stage PDAC

Though the performance of REG1A and REG1B are very similar, REG1B outperformed REG1A when control samples were compared to stage I-IIA PDAC samples (Kruskal-Wallis test; $p < 0.0003$). [1] Therefor, all experiments following were performed using REG1B as part of the biomarker panel.

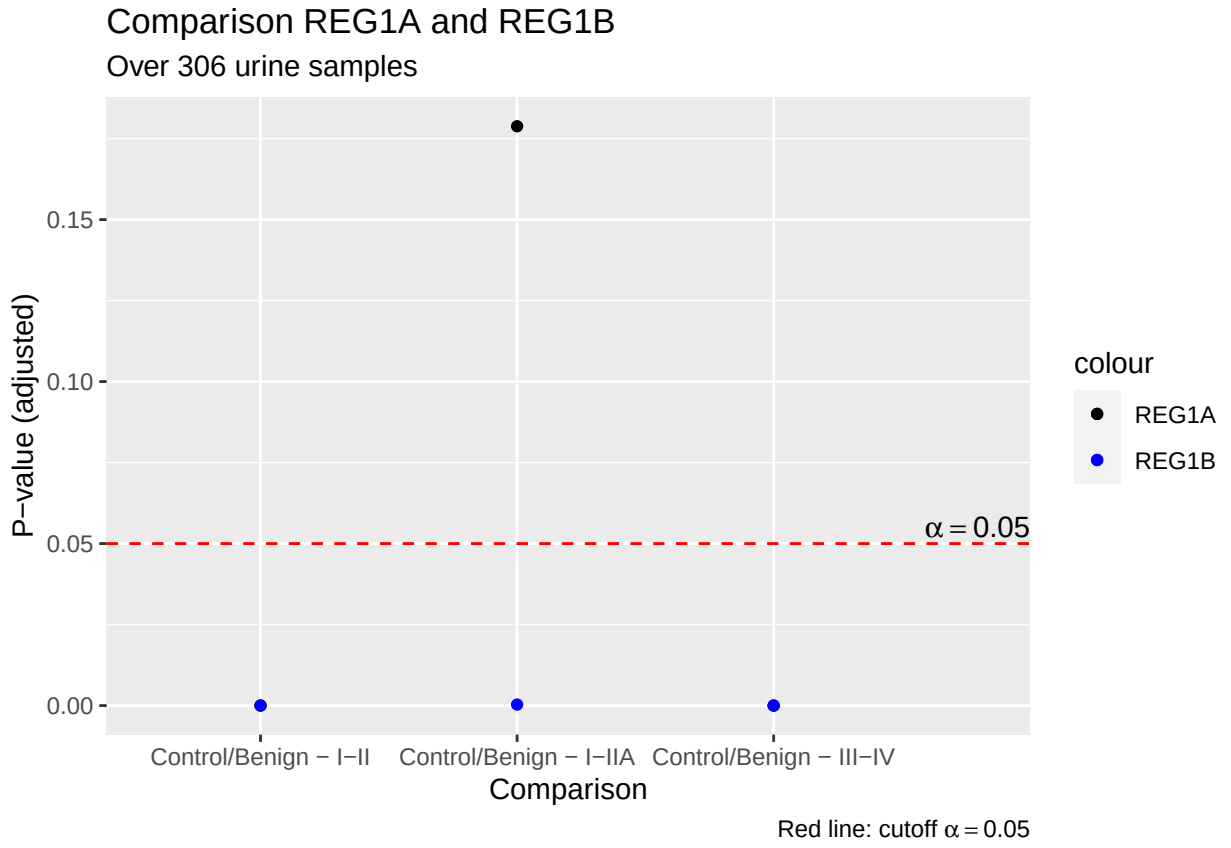

Figure 1: P-values of Kruskal-Wallis test, Dunn's multiple comparisons over 166 Control/Benign samples, and 140 PDAC samples (16 stage I-IIA, 54 stage I-II, 70 stage III-IV)

3.3 Correlation in urine biomarkers for different diagnosis groups

The biomarker panel was tested in a total of 590 urine samples (183 control, 208 benign, and 199 PDAC). According to the PCA, the LYVE1 and REG1B biomarkers are close related to eachother. Aside from that, the different diagnosis groups create clusters, meaning there is significant difference between the samples.

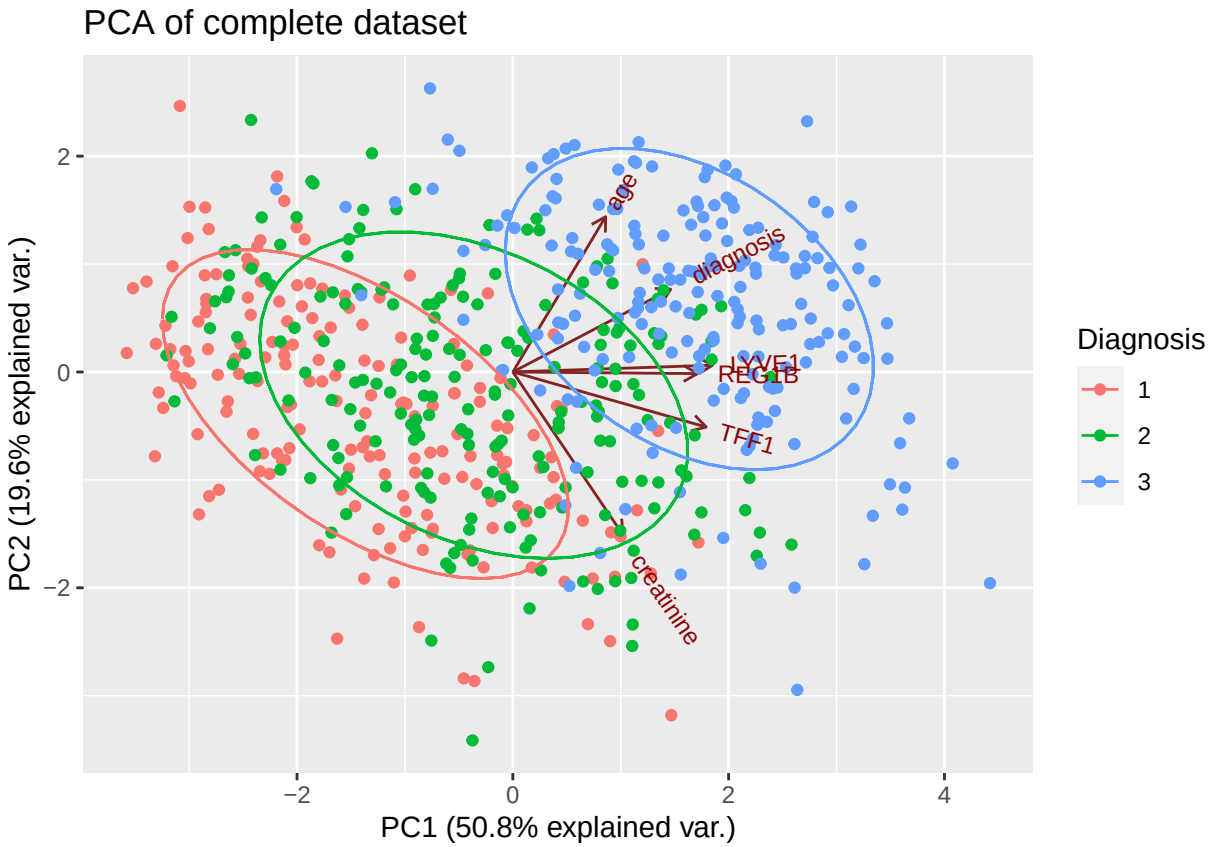

Figure 2: PCA plot showing the correlations between the biomarkers.

4 Conclusion

- REG1A shows no significant difference when control samples are compared to PDAC stage I-IIA samples, though REG1B does show significance: REG1B outperforms REG1A in detecting PDAC in early stages.
- LYVE1 and REG1B are closely related biomarkers. A good focus for the prediction following.

5 Discussion

6 References