

The inflammatory profiles of hypertensive older adults in different total cholesterol level groups

Gavrila Ang, 606 (Spring 2022)



Quick Overview



Lab Session Overview:

10:30 AM - 4PM – transportation provided by HAPI-CHI

Morning

Blood & Urine Sample Collection
Health History Interview
Balance & Posture Tests

Lunch – Meal is provided by HAPI-CHI

Blood Pressure & Blood Flow Testing
• EKG measurements various positions
• Pulse Wave Velocity
• Stationary Bicycle Test

Consent Signing

Pre-value collection
Hillcrest Lab Test

V1

UCSD Hillcrest
LAB

Earn up to:

\$75

12 Week Program

Week 6
Mid-session Test

V2

Program Site

Post-value collection
Hillcrest Lab Test

V3

UCSD Hillcrest
LAB

3 Months
Follow-up Test

V4

Program Site

6 Months
Follow-up Test

V5

Program Site

9 Months
Follow-up Test

V6

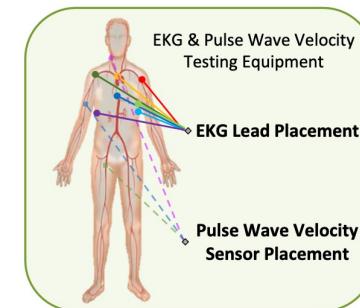
Program Site

Randomization: By participating in the HAPI-CHI research study, you are agreeing to participate in an assigned program. Your assignment will be based on chance and is randomly assigned to you.

Interactive seminar series: 1 class per week – 2h each

Movement based Tai Chi: 2 class per week – 1h each

Participation in all aspects of this study are strictly voluntary.
You may refuse to participate or withdraw at any time
without penalty or loss of benefits to which you are entitled.



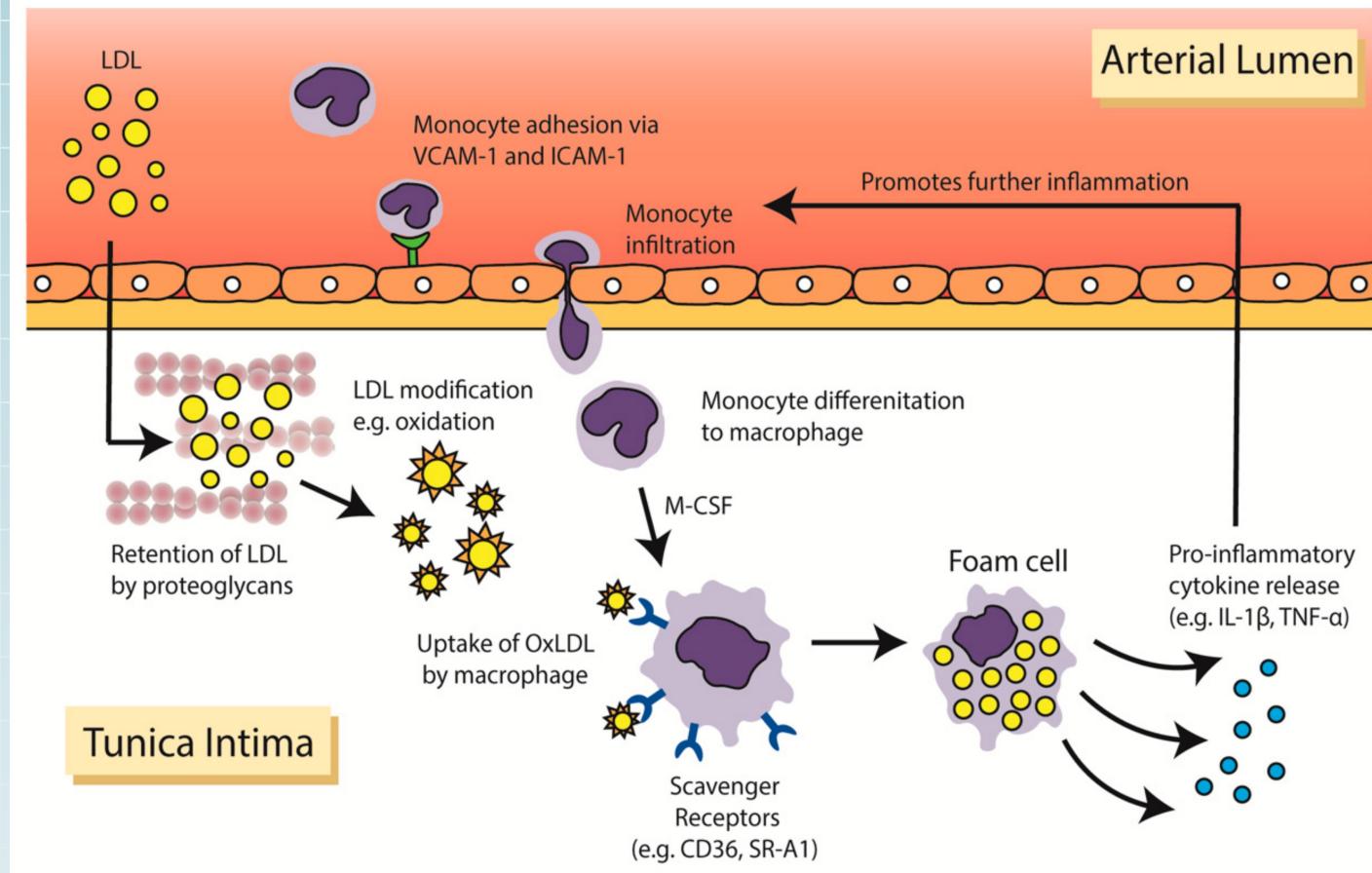
\$50/\$25

\$100

\$25

\$25

\$25



Source: Nguyen MT, Fernando S, Schwarz N, Tan JT, Bursill CA, Psaltis PJ. Inflammation as a Therapeutic Target in Atherosclerosis. *Journal of Clinical Medicine*. 2019; 8(8):1109. <https://doi.org/10.3390/jcm8081109>



Hypothesis

H_0 : Hypertensive older adults in different total cholesterol serum levels do not have different immune profiles

H_1 : Hypertensive older adults in different total cholesterol serum levels have different immune profiles

Table 1: LabCorp Reference Intervals for Total Cholesterol Serum Measurements

Age (y)	Acceptable	Borderline	High
> 19	<200 (or 100-199)	200-239	240
	92	51	14



labcorp

Clinical Measurements

Measurement	Scale	Biological Function	Processing Method / Sample Type
Total cholesterol	mg/dL	-	LabCorp (whole blood)
Neutrophils	Absolute counts	Innate immune system	LabCorp (whole blood)
Lymphocytes	Absolute counts	Adaptive (T, B and <u>Natural Killer</u> cells)	LabCorp (whole blood)
Monocytes	Absolute counts	Innate, APC, big TNF producer	LabCorp (whole blood)
Eosinophils	Absolute counts	Innate (allergic reactions)	LabCorp (whole blood)
Basophils	Absolute counts	Innate (allergic reactions)	LabCorp (whole blood)
Immature granulocytes	Absolute counts	Innate (early responder)	LabCorp (whole blood)

Clinical Measurements

Measurement	Scale	Biological Function	Processing Method / Sample Type
CRP (C-reactive protein)	pg/mL	Clinical measurement of acute phase inflammation	V-PLEX Vascular Injury Panel 2 Human Kit (Meso Scale Discovery)
SAA (Serum amyloid A)	pg/mL	Clinical measurement of acute phase inflammation	V-PLEX Vascular Injury Panel 2 Human Kit (MSD) (plasma)
soluble ICAM (Intracellular adhesion molecule 1)	pg/mL	Adhesion molecule mediating leukocyte extravasation	V-PLEX Vascular Injury Panel 2 Human Kit (MSD) (plasma)
soluble VCAM (Vascular adhesion molecule 1)	pg/mL	Adhesion molecule mediating leukocyte extravasation	V-PLEX Vascular Injury Panel 2 Human Kit (MSD) (plasma)

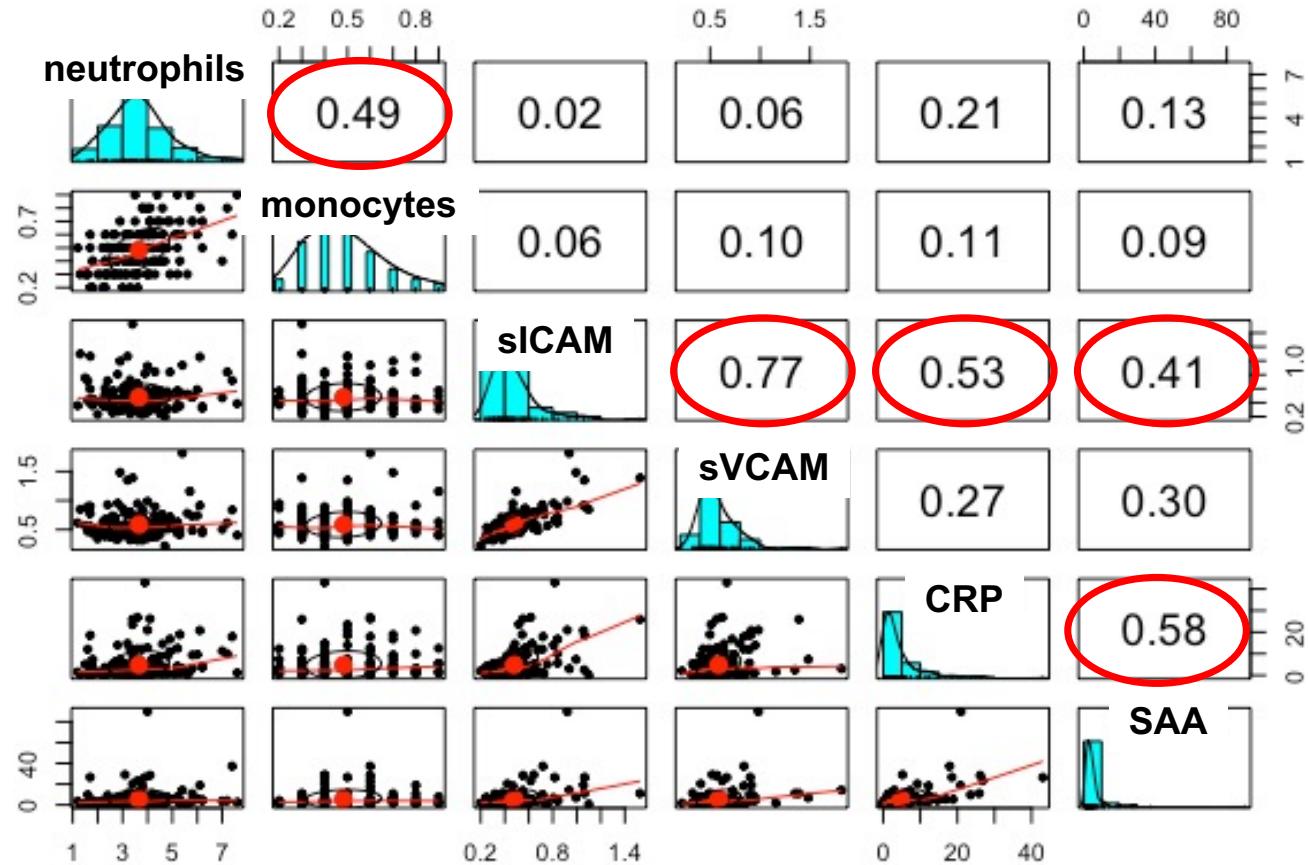
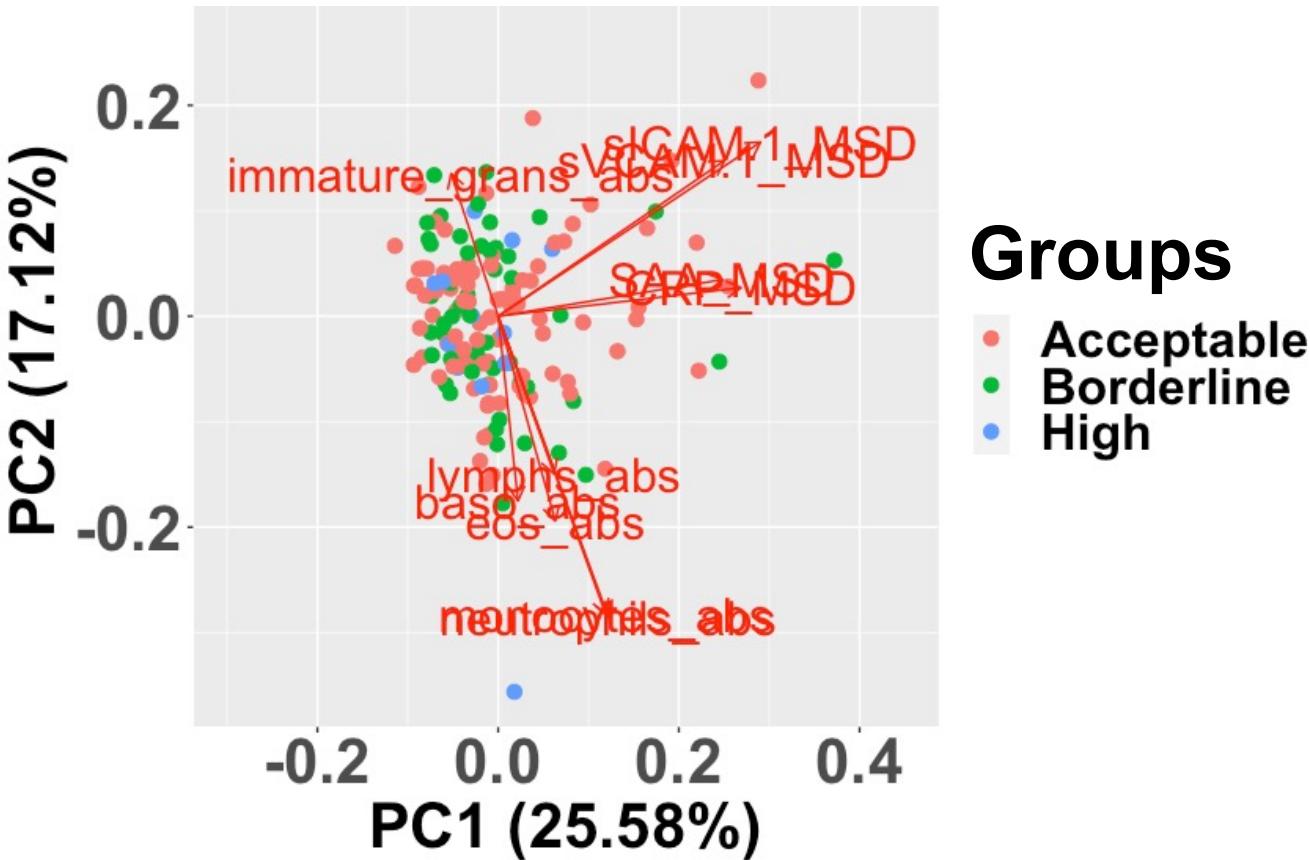


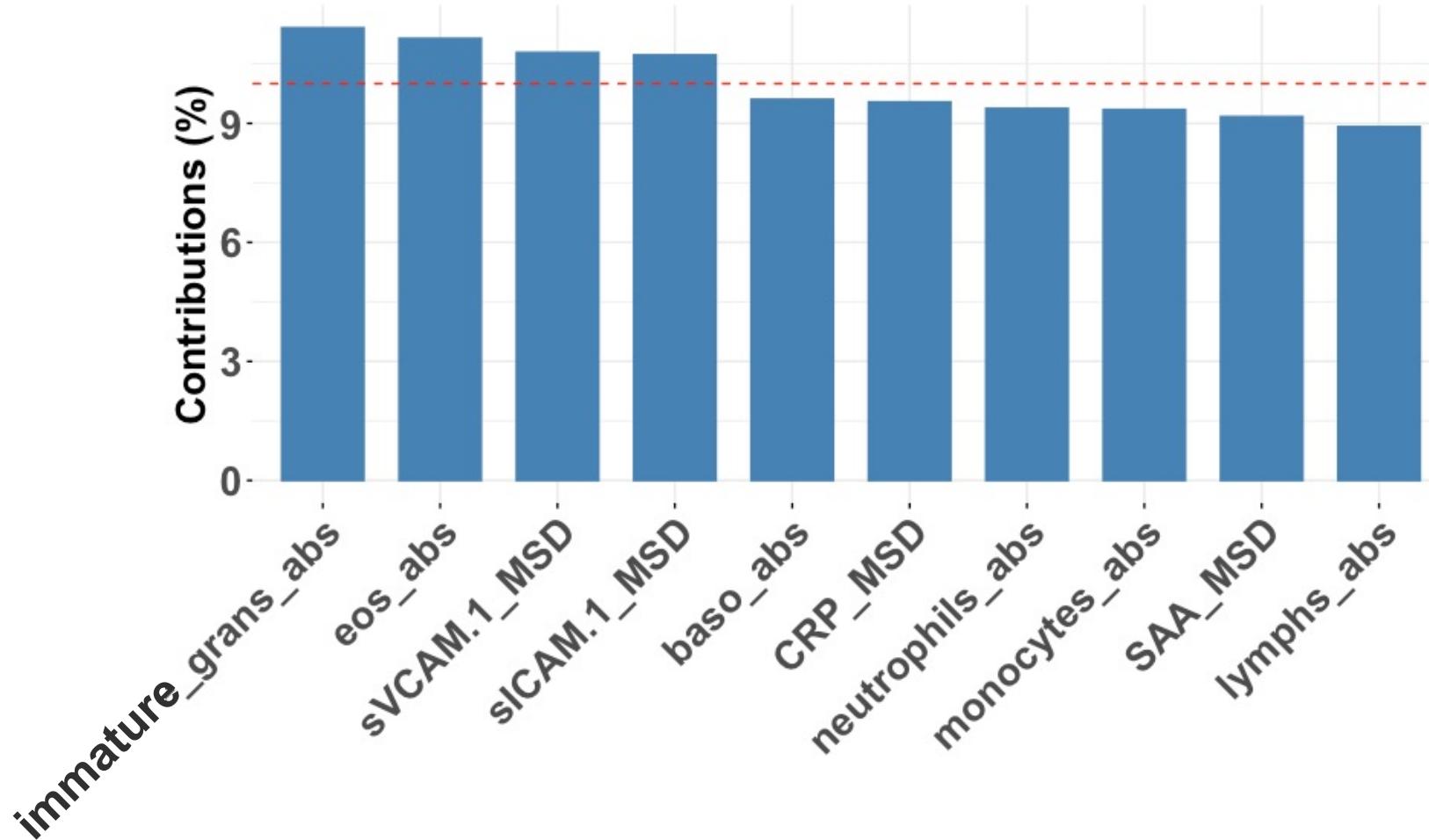
Table 4: Principal Components (PCs) Derived and Proportion of Variation Explained in Full Dataset

	PC1	PC2	PC3	PC4	PC5	PC6
Cumulative Proportion	0.256	0.427	0.541	0.640	0.736	0.823
	PC7	PC8	PC9	PC10		
Cumulative Proportion	0.893	0.943	0.984	1.000		

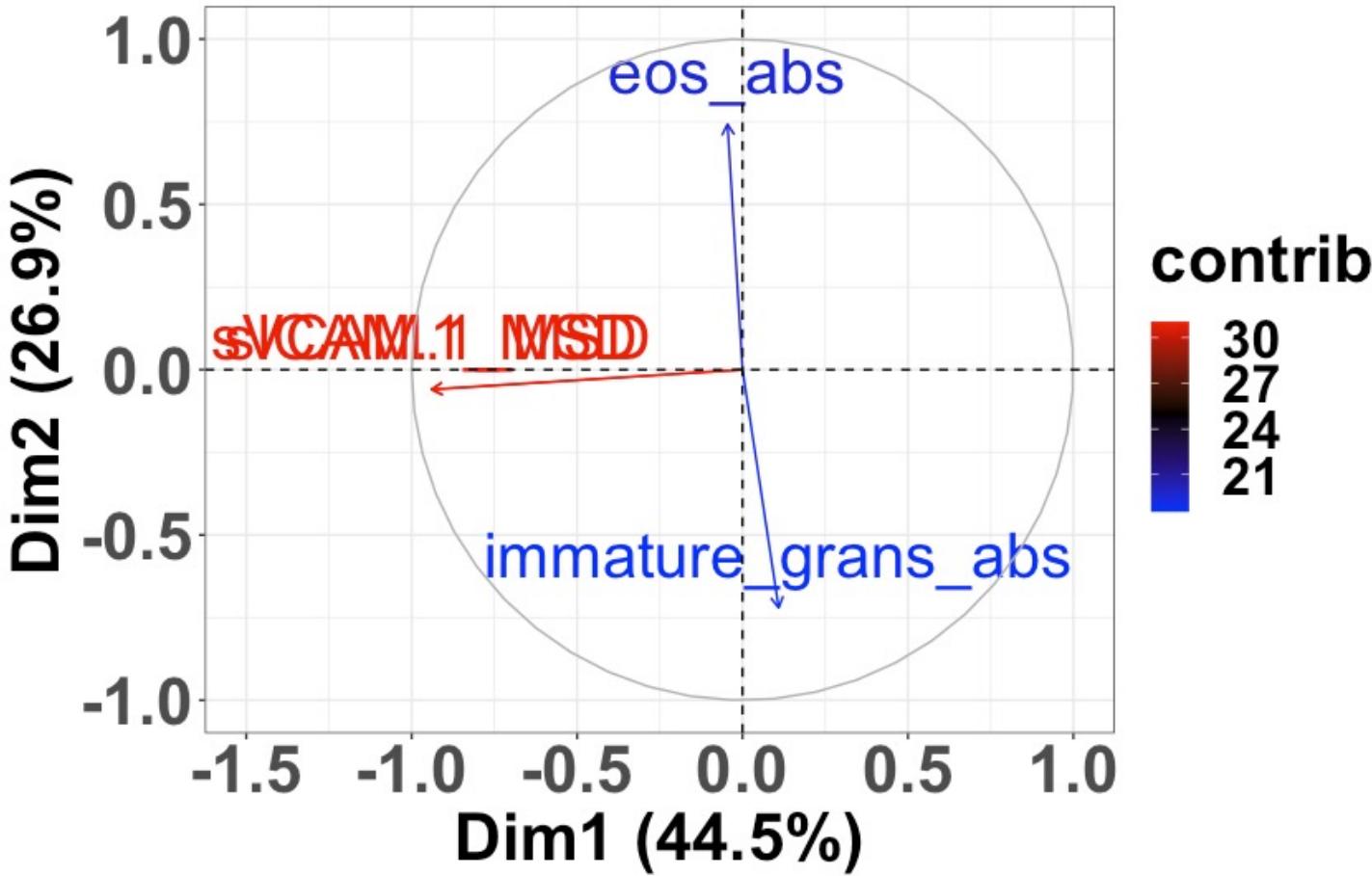
PCA (Principal Components Analysis) – Biplot (Full Dataset)



Contribution of variables to Dim-1-2-3-4-5-6



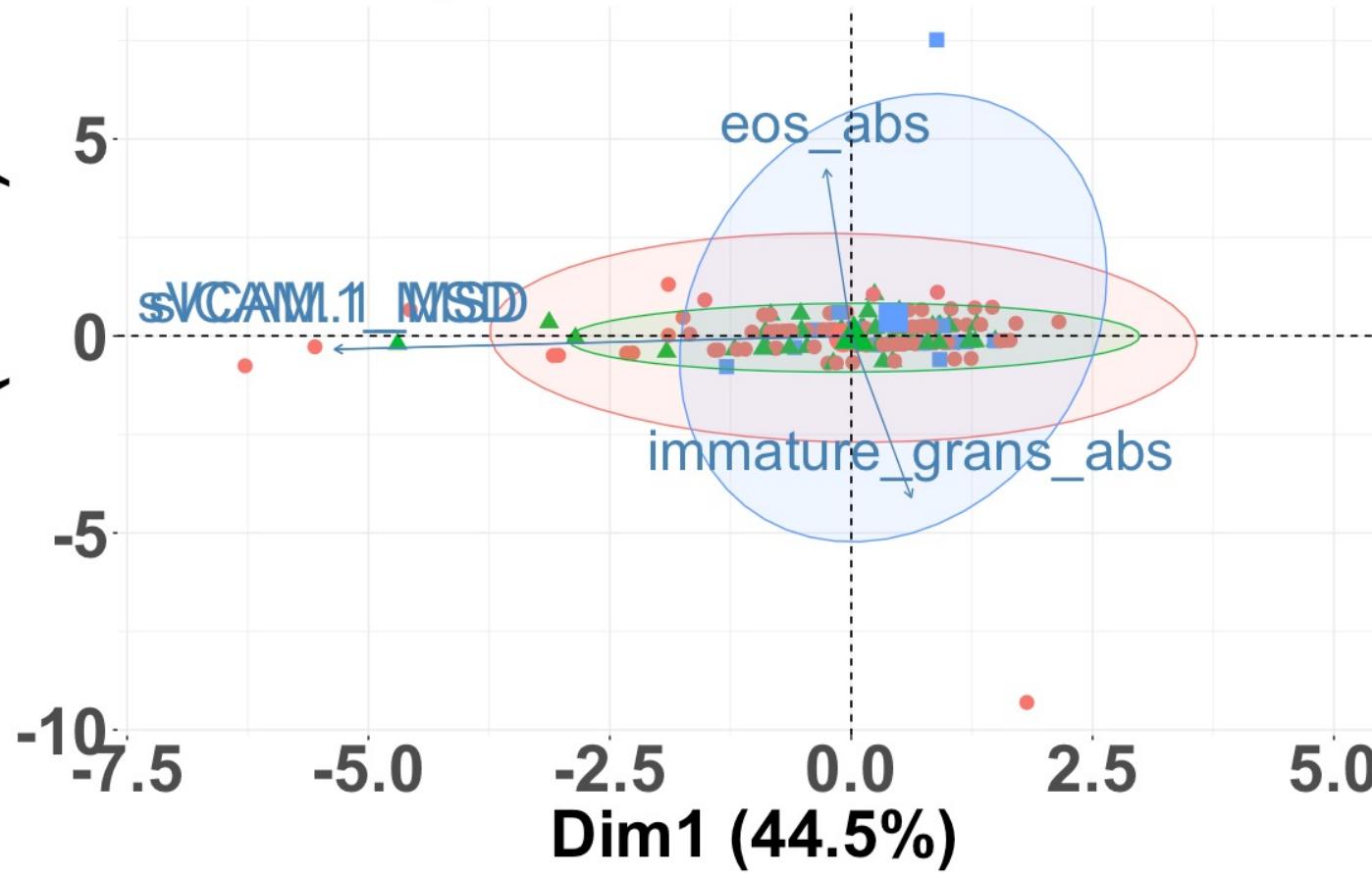
Variables - PCA (Reduced)



Cumulative Proportion of variance explained by PC1 and PC2 = 71.4%

PCA - Biplot (Reduced)

Dim2 (26.9%)



Groups

- Acceptable
- Borderline
- High

Conclusions

- Accept H_0 : Hypertensive older adults in different total cholesterol serum levels do not have different immune profiles
- sICAM and sVCAM measurements can be used as proxies for each other
- Eosinophils and immature granulocytes appear to play a predominant role in the inflammatory state of hypertensive older adults; further investigation may be warranted

Contributors

Principal Investigator

- Dr. Suzi Hong
- Dr. Laura Redwine

Statistics Consultation

- Professor Luke Miller

Research Managers/Associates

- Dr. Meredith Pung
- Gavrila Ang
- Kathleen Wilson

PostDocs

- Dr. Emily Troyer
- Dr. Jordan Kohn

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References

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- Helmy A, Antoniades CA, Guilfoyle MR, Carpenter KL, Hutchinson PJ. Principal component analysis of the cytokine and chemokine response to human traumatic brain injury. *PLoS One*. 2012;7(6):e39677. doi:10.1371/journal.pone.0039677