



A Latent Variable for Systemic Inflammation in the Health and Retirement Study

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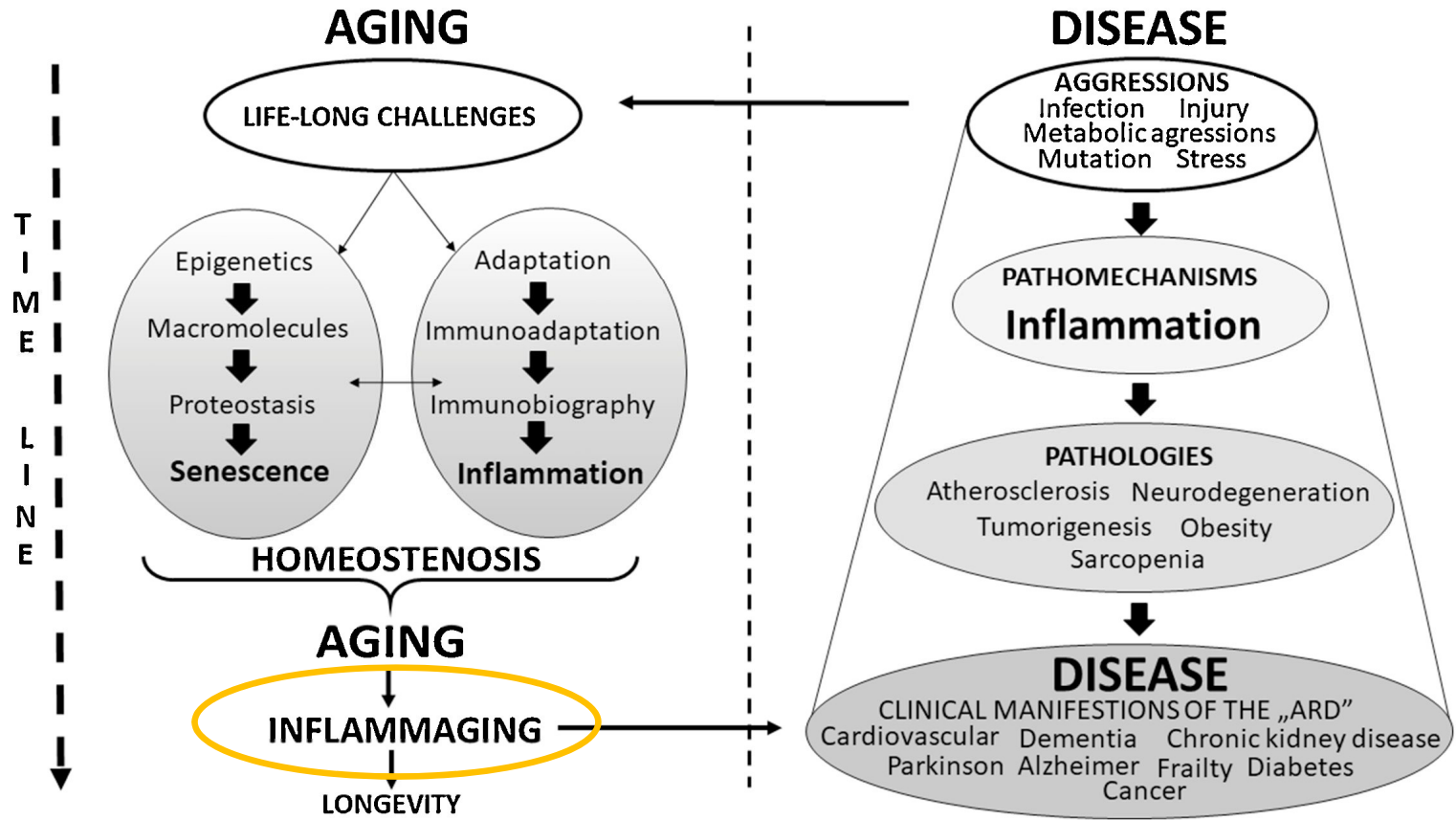
Survey Research Center

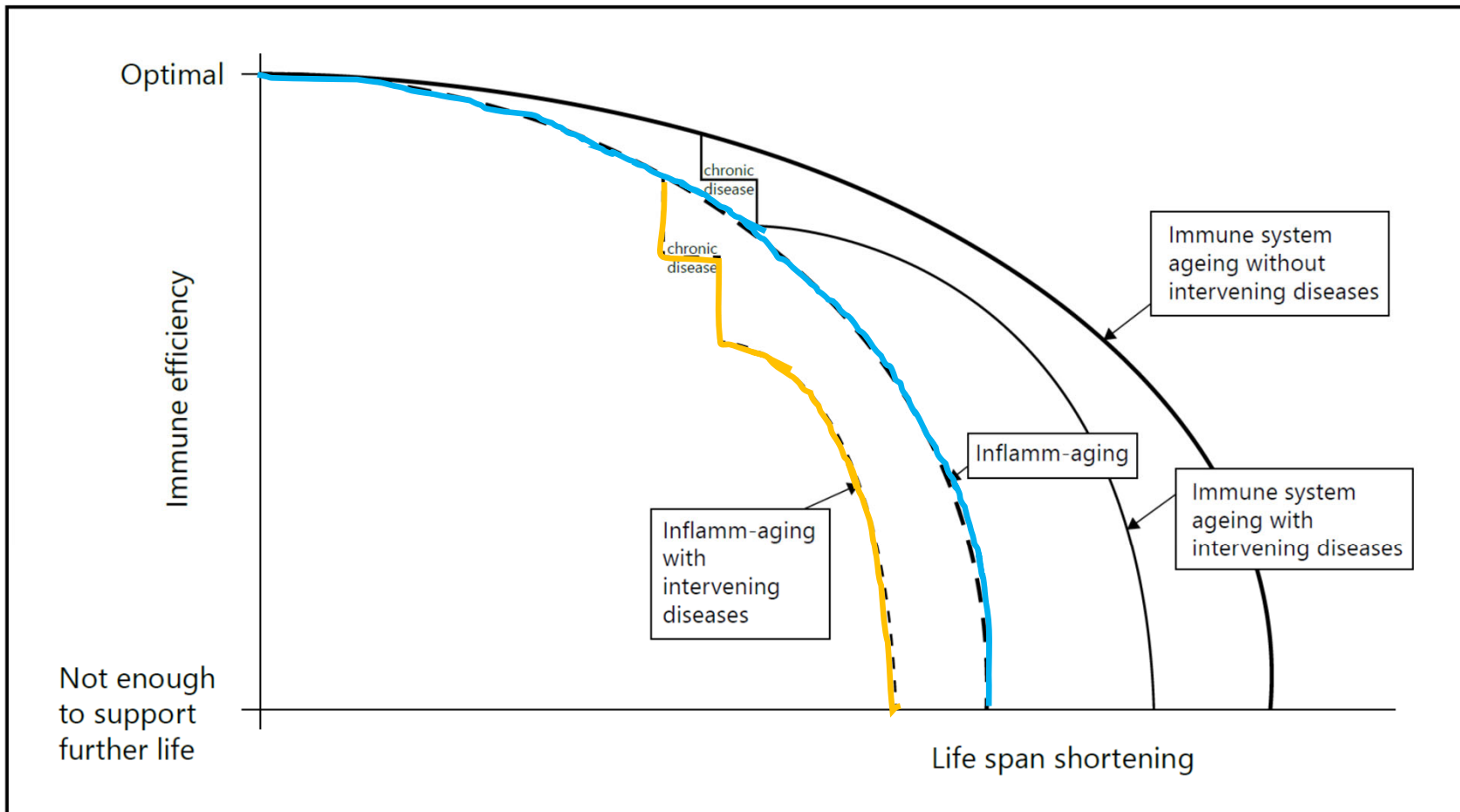
Institute for Social Research

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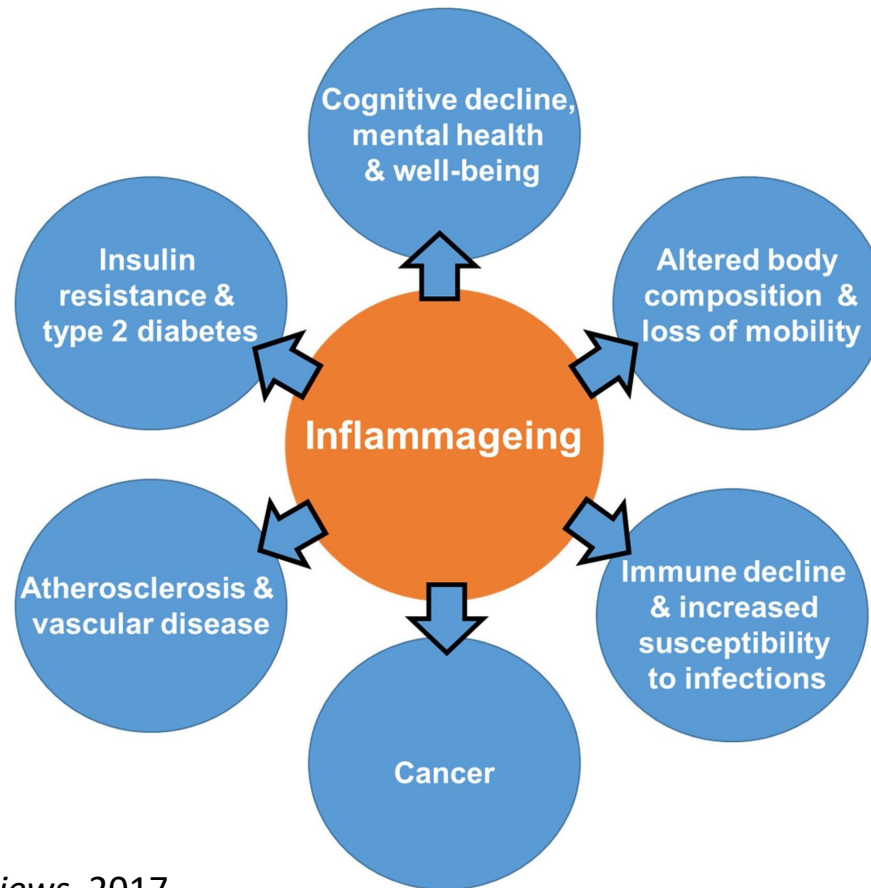
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NIA Biomarker Network: April 12, 2023

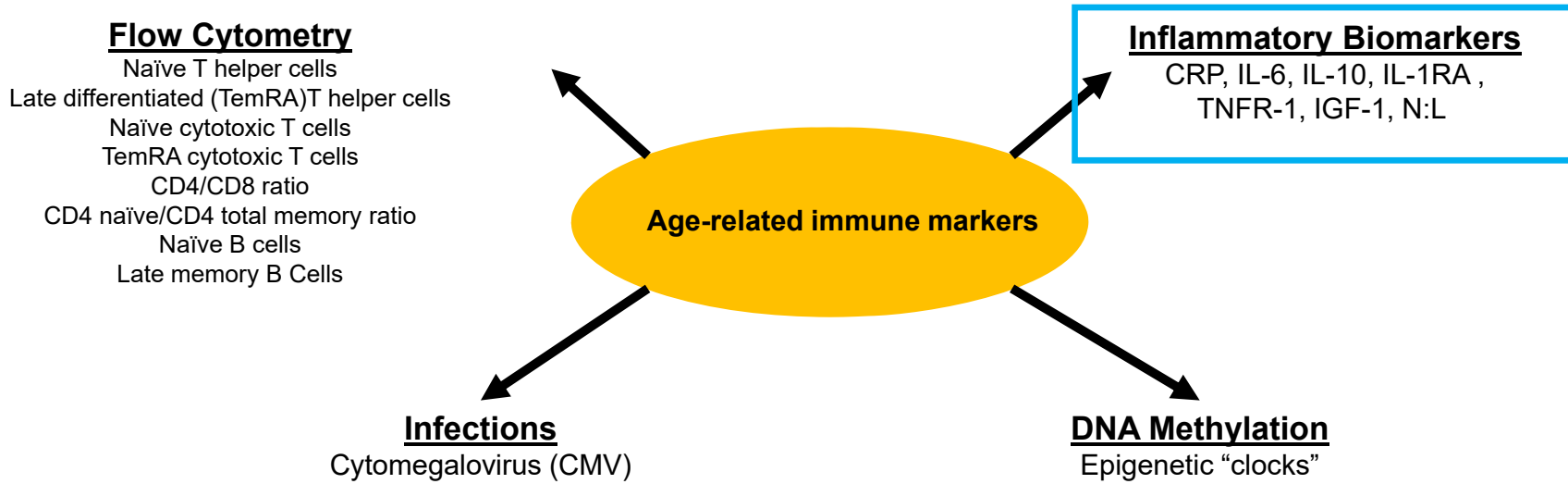




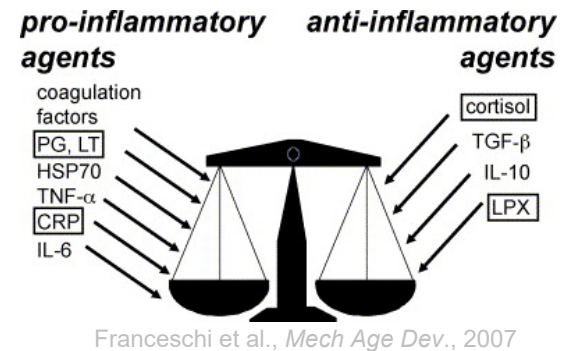
Inflammation is associated with health outcomes



Health and Retirement Study 2016 Venous Blood Study

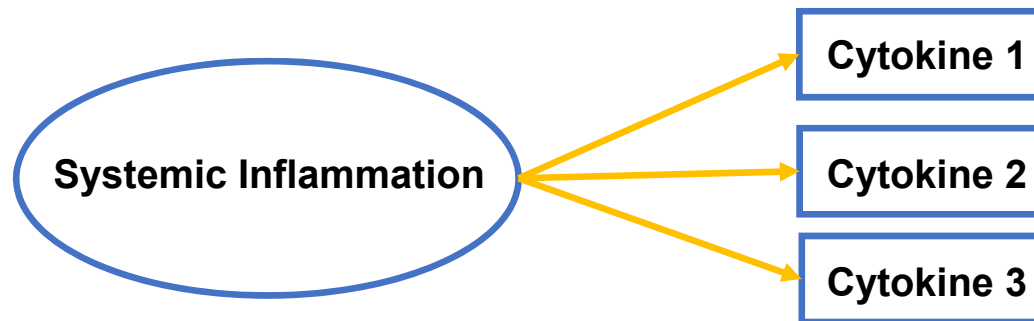


Limitation: Many studies only examining one or a few inflammation markers individually with aging health outcomes at a time



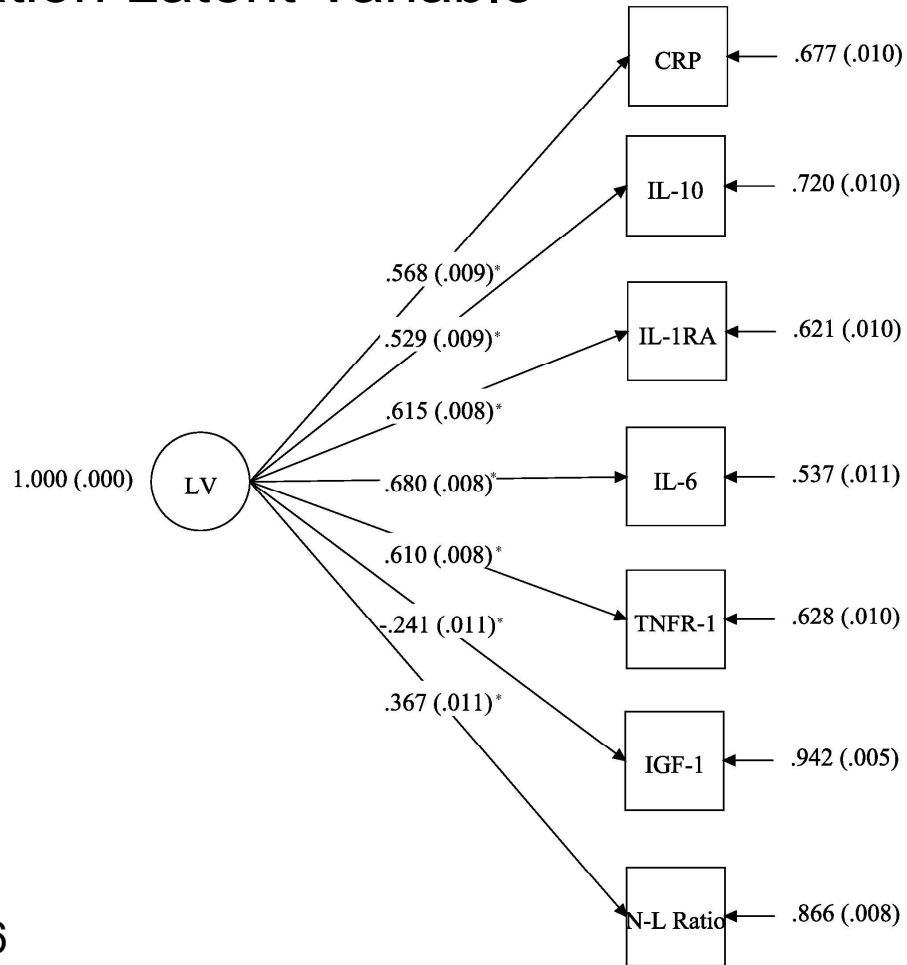
Conceptualize underlying construct of systemic inflammation

- Measured individual cytokines are indicators of the underlying construct
- Obtain an estimate for underlying systemic inflammation construct using factor analysis





Systemic Inflammation Latent Variable



RMSEA: 0.072, CFI: 0.936

Associations between Inflammation LV and Epigenetic Clocks (N=3,113)

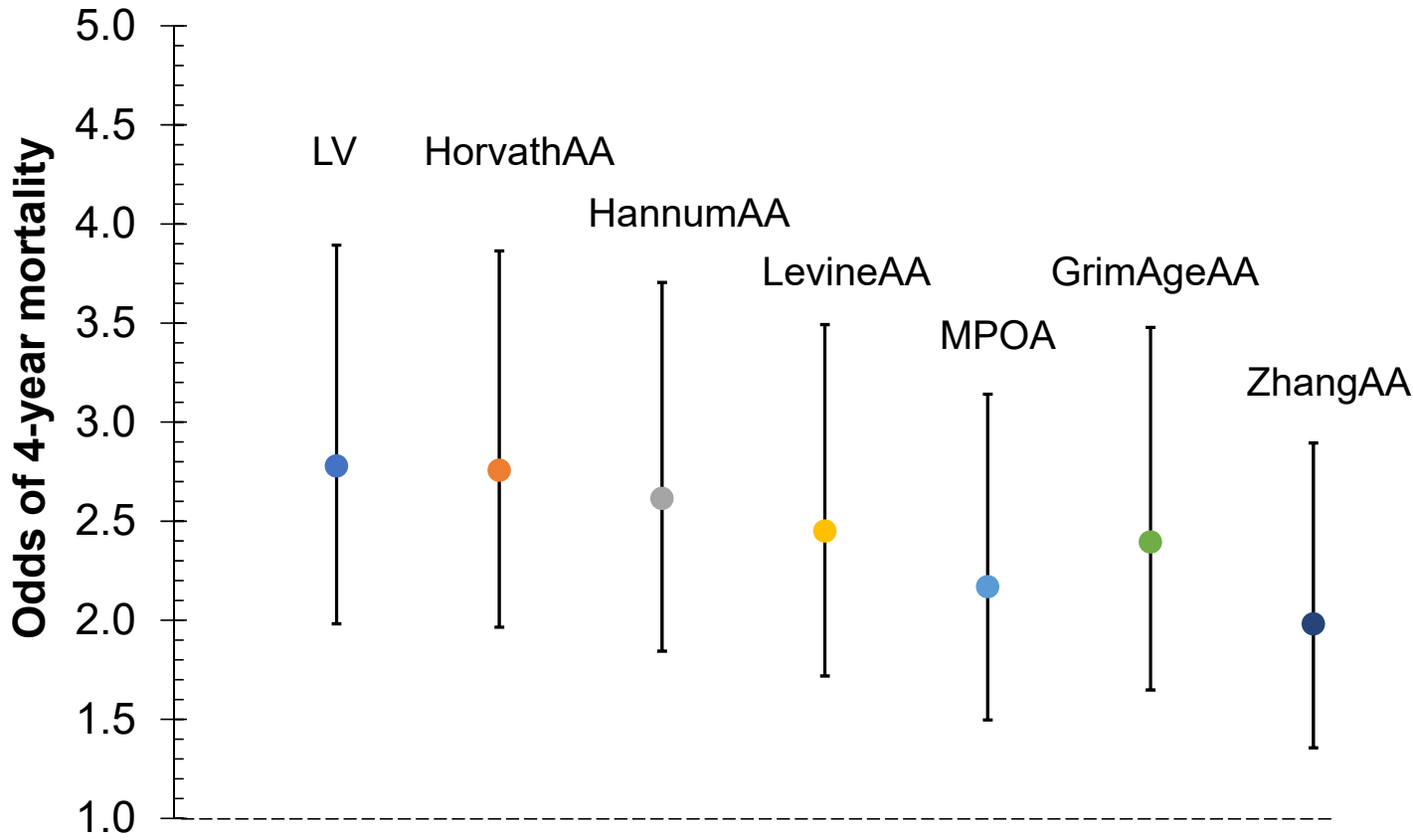
DNAmAA	Latent Variable Standardized			LogCRP Standardized		
	Beta	p-value	R ²	Beta	p-value	R ²
Horvath	0.06768	0.1265	0.0313	0.02878	0.1681	0.0314
Hannum	0.32142	<.0001	0.1417	0.09503	<.0001	0.1273
Levine	0.46825	<.0001	0.09295	0.1485	<.0001	0.06634
SkinBlood	0.13787	0.0015	0.03173	0.03948	0.0709	0.02937
Lin	0.21768	<.0001	0.03568	0.05298	0.0203	0.02806
Weidner	0.03699	0.3984	0.03445	-0.0125	0.5748	0.03446
Vidal-Bralo	0.38551	<.0001	0.09217	0.13646	<.0001	0.0773
GrimAge	0.55477	<.0001	0.4524	0.19766	<.0001	0.4227
Yang	-0.3148	<.0001	0.3997	-0.1023	<.0001	0.3857
Zhang	0.56209	<.0001	0.3552	0.15941	<.0001	0.3106
Brocklandt	-0.2358	<.0001	0.06938	-0.0895	<.0001	0.06431
Garagnani	0.01716	0.7002	0.03583	-0.0028	0.9025	0.03582
MPOA	0.62973	<.0001	0.2968	0.25686	<.0001	0.2714

Independent associations with 4-year mortality

CRP: OR=1.42
(1.22, 1.64)

Variable	4-year Mortality OR	95%CI	MODEL ROC
Inflammation LV	2.778	1.982 3.893	0.819
HorvathAA	1.101	0.938 1.294	0.816
HannumAA	1.327	1.159 1.521	0.804
LevineAA	1.437	1.260 1.639	0.809
GrimAgeAA	1.837	1.568 2.153	0.816
MPOA	1.488	1.280 1.731	0.809
ZhangAA	2.053	1.689 2.495	0.821

Association between Inflammation LV and 4-year mortality adjusting for epigenetic age acceleration



Receiver operating characteristic (ROC) statistics predicting 4-year mortality

Variable	ROC
Chronologic Age	0.7442
Inflammatory latent variable	0.6798
GrimAA	0.6603
MPOA	0.6282
Multimorbidity	0.6239
LevineAA	0.6174
HorvathAA	0.5331
CMV positivity	0.5315
Obesity	0.4590

Acknowledgements

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Questions?