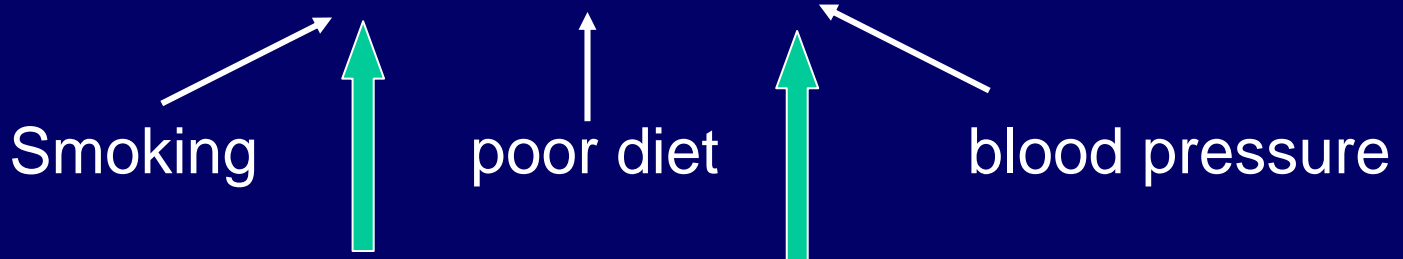
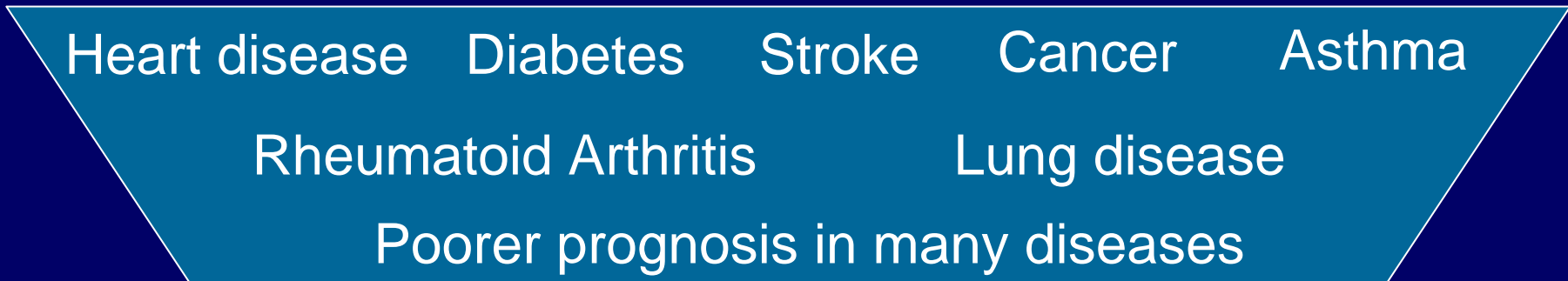
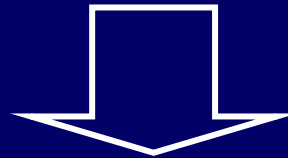

Psychosocial and biological
determinants of health
(pSoBid)

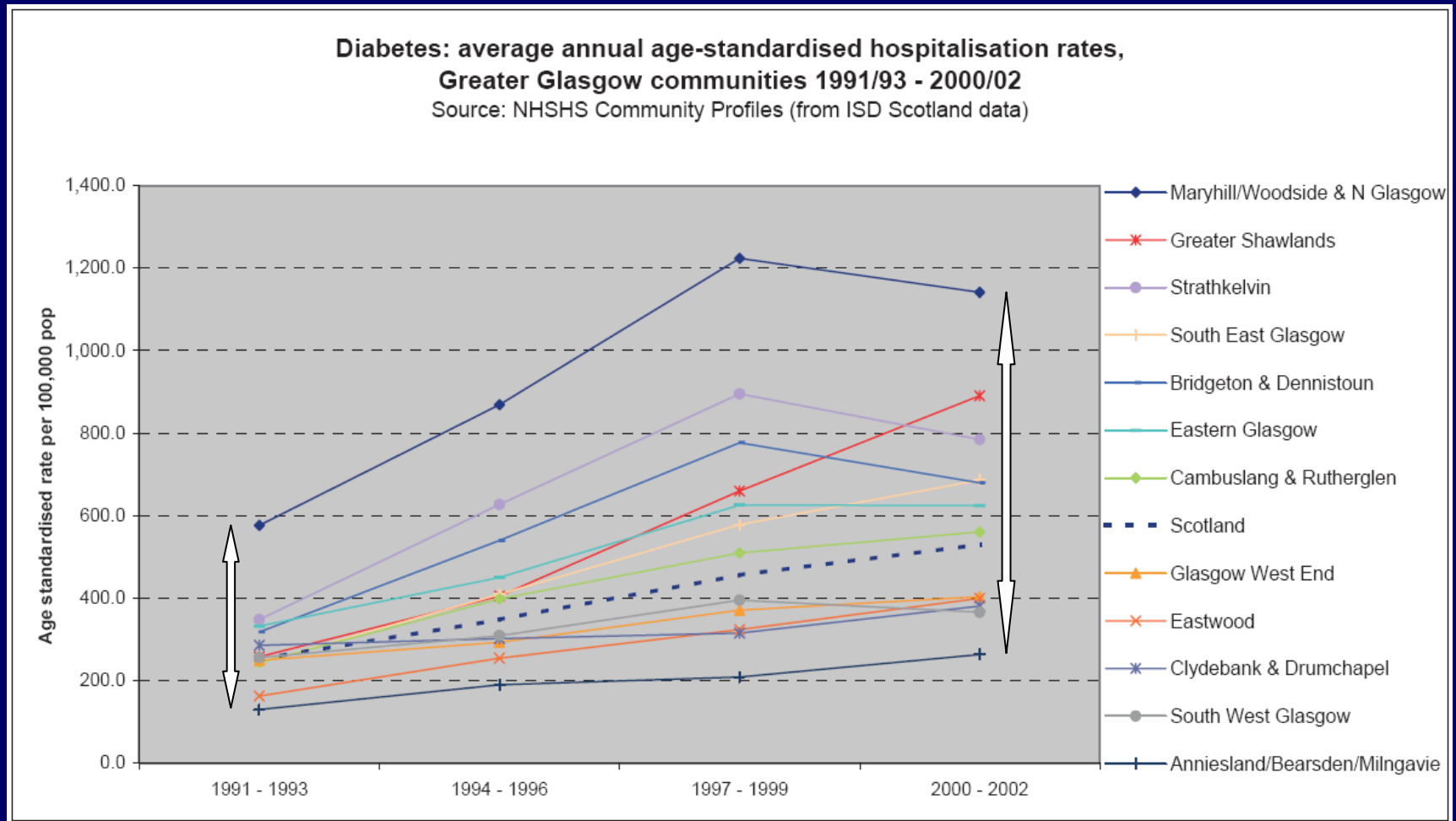
Social inequality and health

Relative social and economic deprivation



Inflammation ↔ Lifelong biological stress

Diabetes and social inequality



Innate immunity

Medscape® www.medscape.com

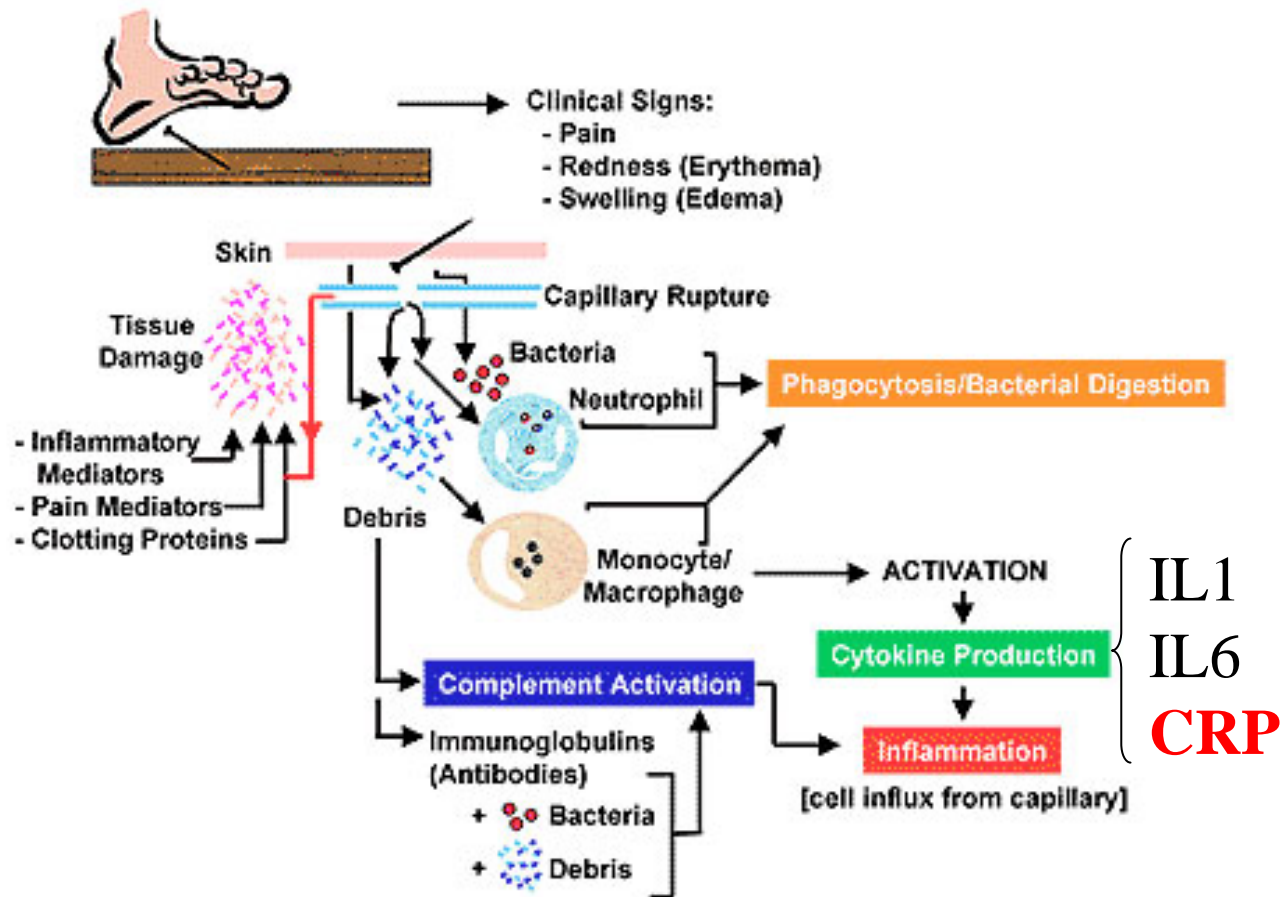
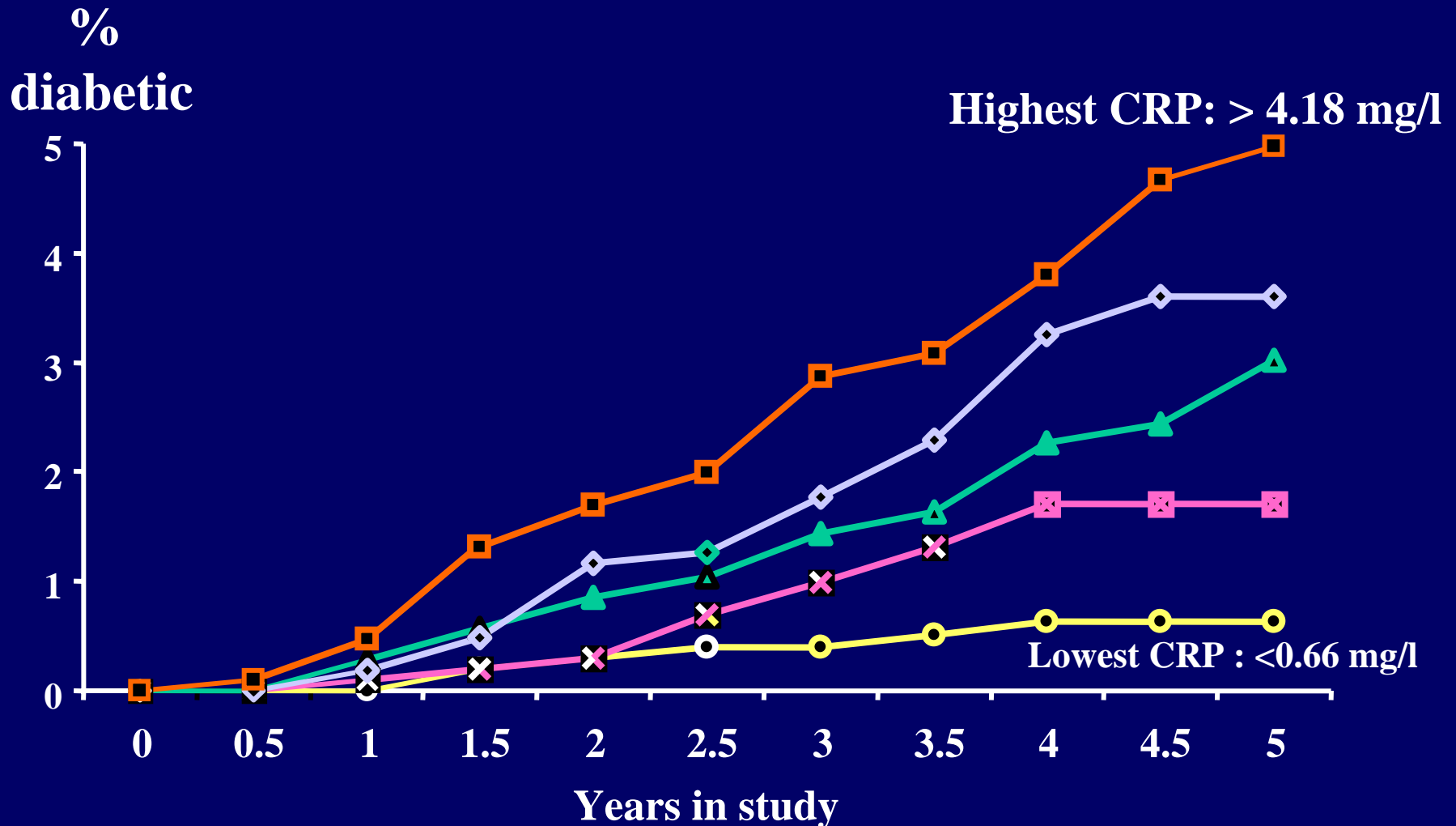


Figure 8. Innate immunity and inflammation.

Inflammation rheostat

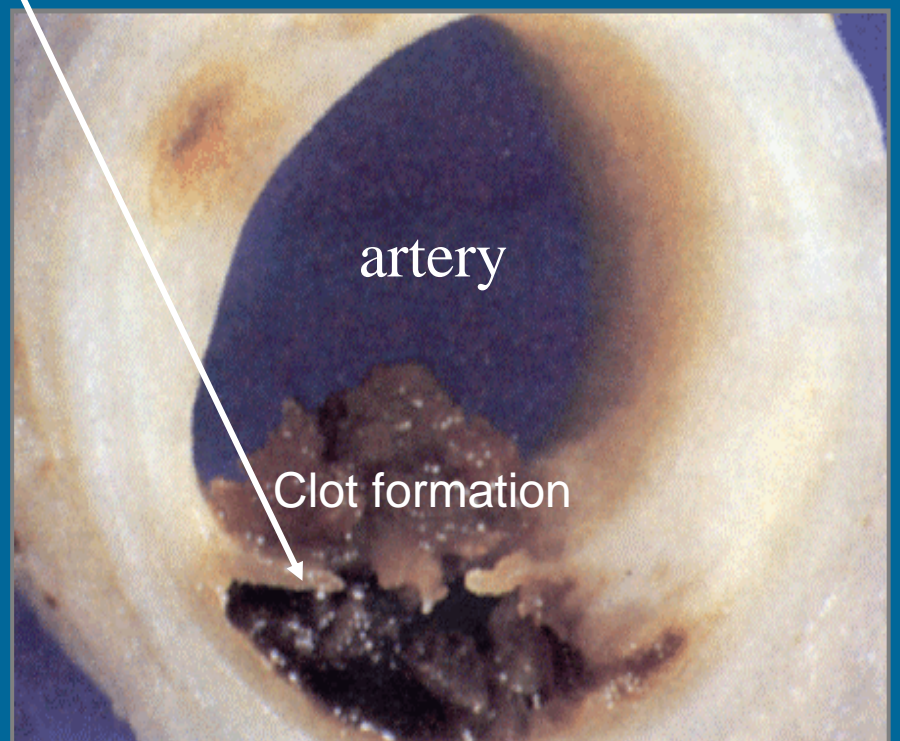
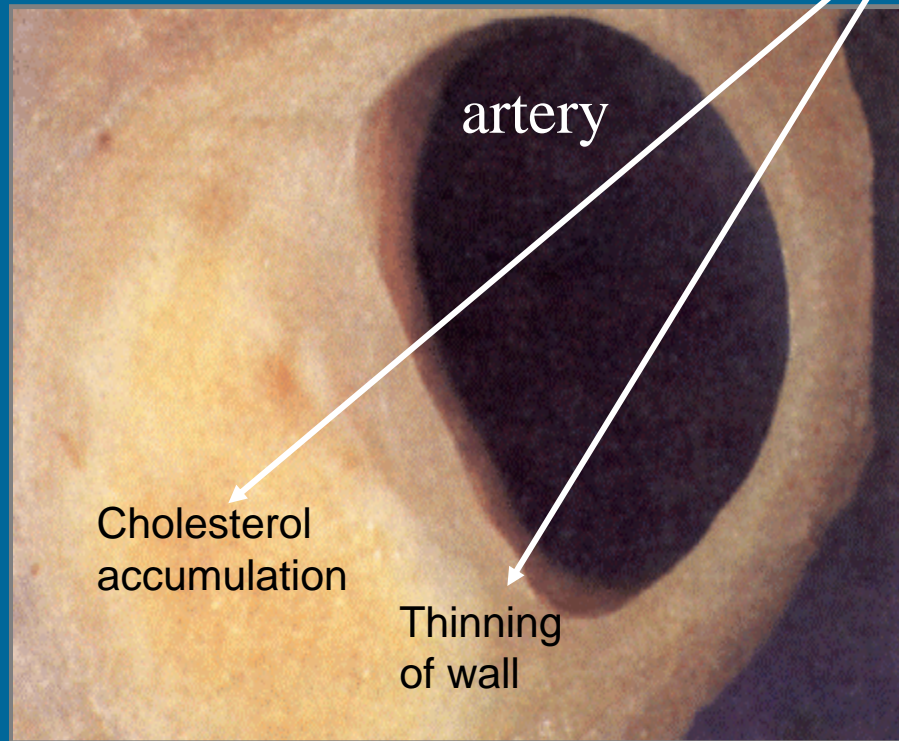


Inflammation and cumulative risk of type 2 diabetes in the West of Scotland

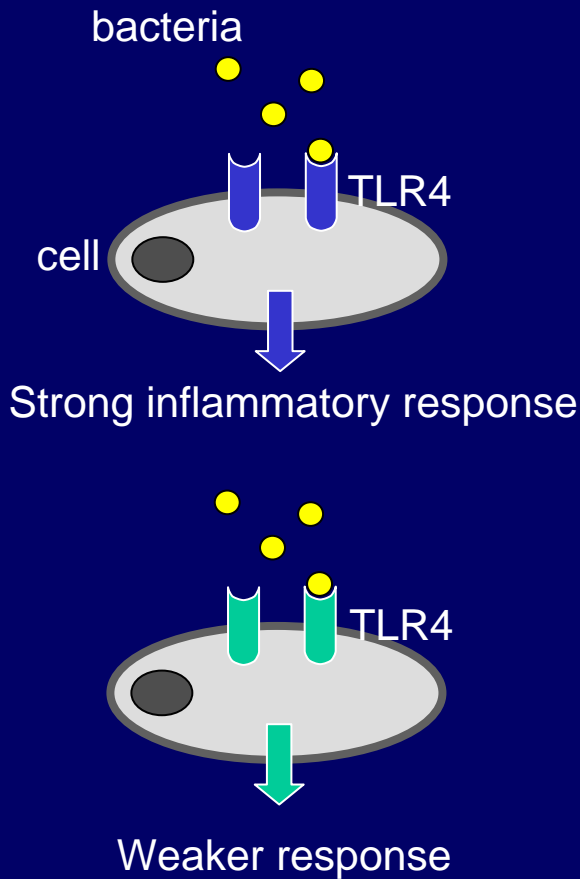


Inflammation and heart disease

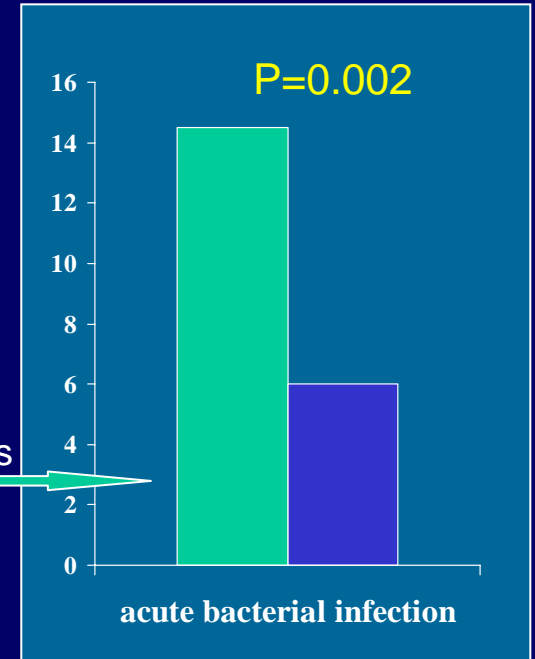
Inflammatory cells (macrophages)



Ying and Yang of innate immunity trading survival against later chronic disease

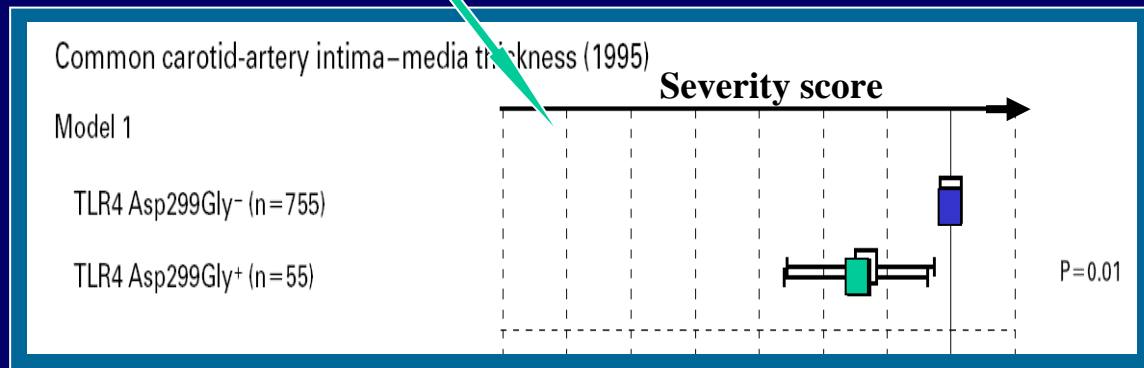


■ TLR4 – usual gene
■ TLR4 – less responsive variant



■ variant more infections

less heart disease



Environmental determinants of inflammatory status in WOSCOPS

	Depcat	% smokers	CRP (median) mg/dl	
			Never-smokers	Smokers
affluent	1	36.8	0.71	1.42
	2	35.9	1.00	2.34
	3	39.1	1.11	2.25
	4	44.1	1.21	2.44
	5	46.6	1.13	2.53
	6	49.3	1.25	3.07
deprived	7	55.5	1.48	3.29

'Stress'

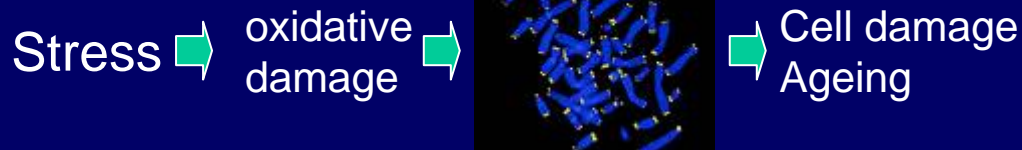
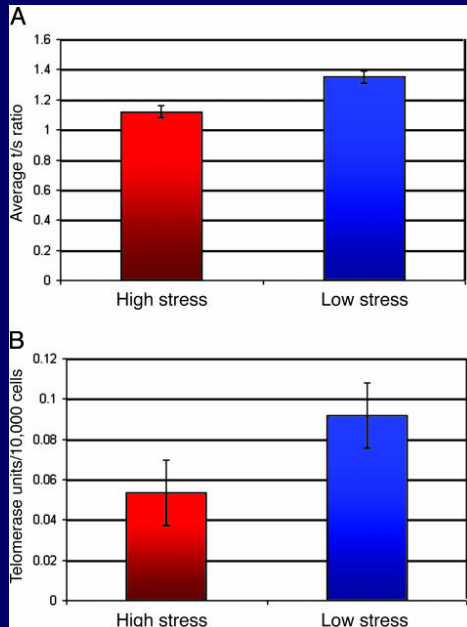
Body's response via the innate immune system, neuroendocrine system (cortisol) to a external or internal stimulus. This response is biological (inflammation, oxidation, hormonal), mental and emotional (involves self).

'Stress' is universal and can be coped with if sporadic, but coping fails if chronic (allostasis)

Biological response to 'stress'

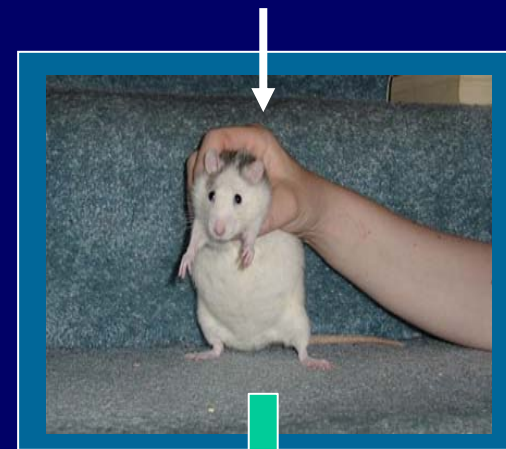
Emotional stress

Effects of stress on telomere length in female long term carers



Biological stress

Bacterial toxin (LPS)



progeny

Increased body weight (abdominal fat)
Insulin resistance
Enhanced stress response

Dahlgren et al. Am J Physiol 2001;281:E326

Epel et al. PNAS 2004;101:17312.

pSoBid

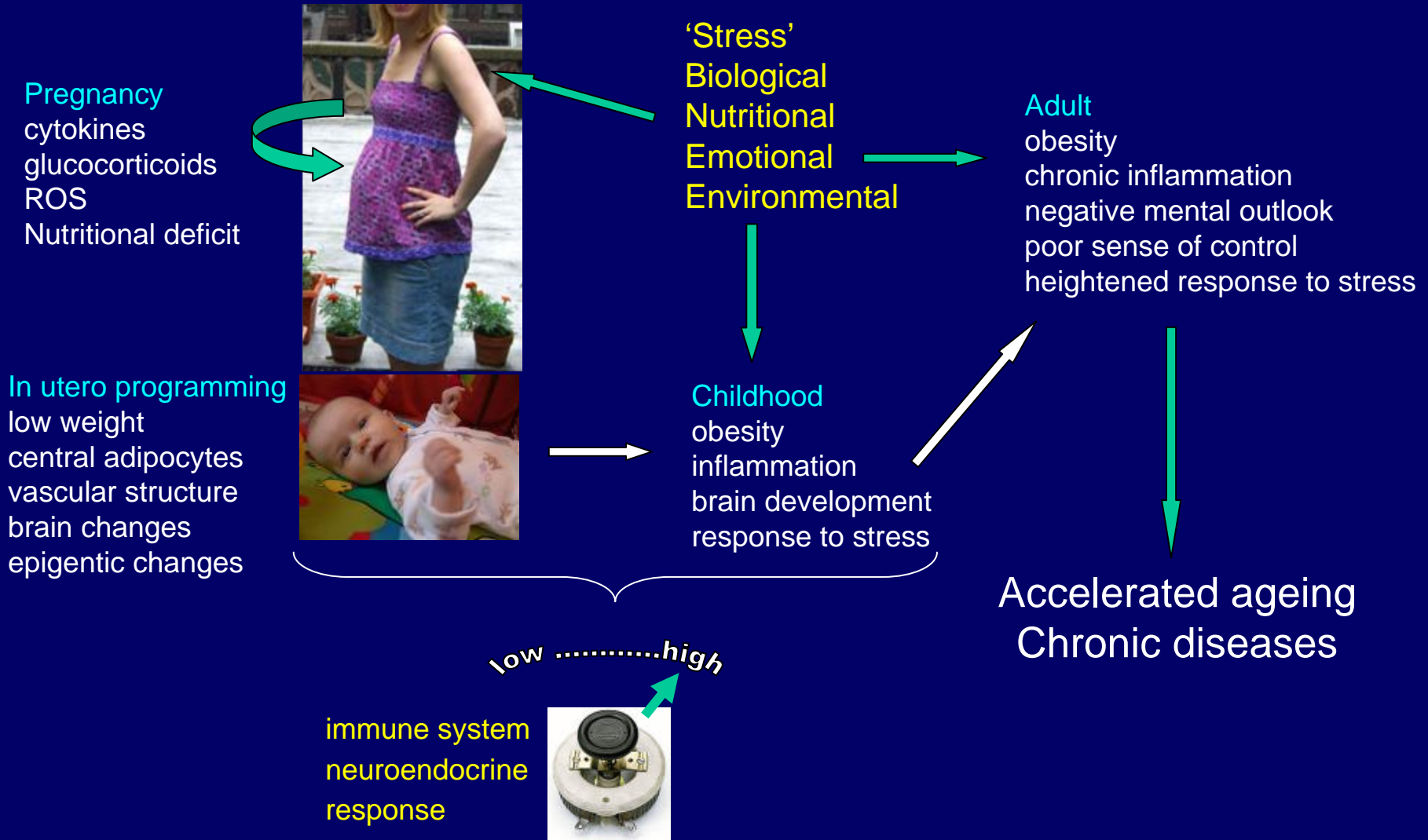
Research question

How does deprivation and its associated emotional, biological and environmental stress affect mental and physical health ?

Hypothesis

Deprivation leads to lifelong 'stresses', chronic inflammation and changes in the neuroendocrine (stress response, coping) system
– *does this explain the wide range of morbidity?*
– *is it reversible?*

Inflammation, and lifelong biological and environmental stress

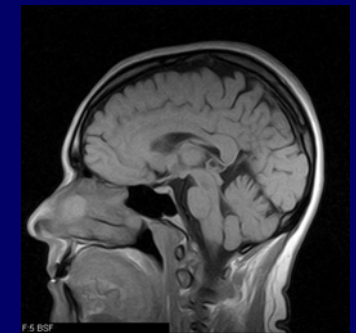
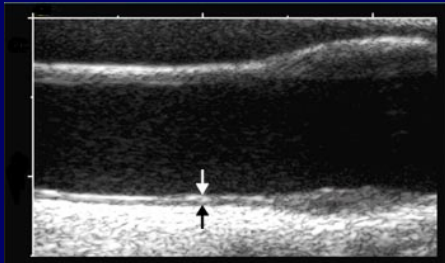
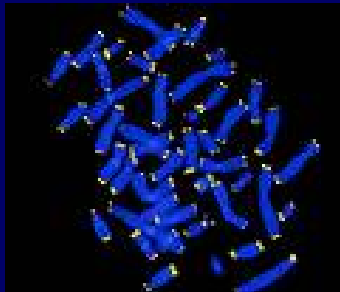


Psycho-social and biological determinants of ill-health in deprivation (pSoBid1)

Glasgow city postcodes	
Least deprived N=350	Most deprived N=350



- Classical risk factors, BP, smoking, lipids.
- Inflammatory markers- CRP, ICAMs, cytokines.
- telomere length
- **carotid artery wall thickness.**
- **vessel elasticity.**
- cognitive function tests.
- personality tests, locus of control, depression.
- hippocampal volume - MRI
- **social circumstances – current, age 12.**
- **effects of housing relocation.**



Hypothesis

Deprivation / adverse environment →

Biological stress-inflammation, oxidation →

CHD, diabetes, arthritis, negative mental outlook

Implications for health improvement strategies

- There is no simple fix for the ill-health associated with social inequality.
- Classical public health messages are not likely to work as well as hoped – do not address causes, recipients not receptive.
- Family and community based approaches may be fruitful in addition to individual appeals.
- Address major risk factors – cholesterol (diet fat), smoking, blood pressure through lifestyle and drugs (minority).
- Devise and implement programmes that reduce environmental, emotional and biological ‘stress’ across generations.
- Partnership not preaching. Partner at community, family and individual levels.
- Reduce ‘stressors’ and increase ability to cope.
- Test interventions in controlled trials

Reducing stressors and increasing coping

Pregnancy

Group and individual support.
Diet, relaxation, coping therapies.



Early life support to 2 years

Diet
Emotional
Stress reduction for parents and child



'Stress'

Biological
Nutritional
Emotional
Environmental

Adulthood

Diet, exercise
Housing, communities, and support networks
Control, ownership of environment
Employment
Lifelong education
Train to cope, CBT lite

Childhood

Diet, exercise
Kindergarten initiatives
Mentoring in Schools (older adults)

Healthy ageing

Diet, exercise
Mental capital
Support communities
Engagement

low high

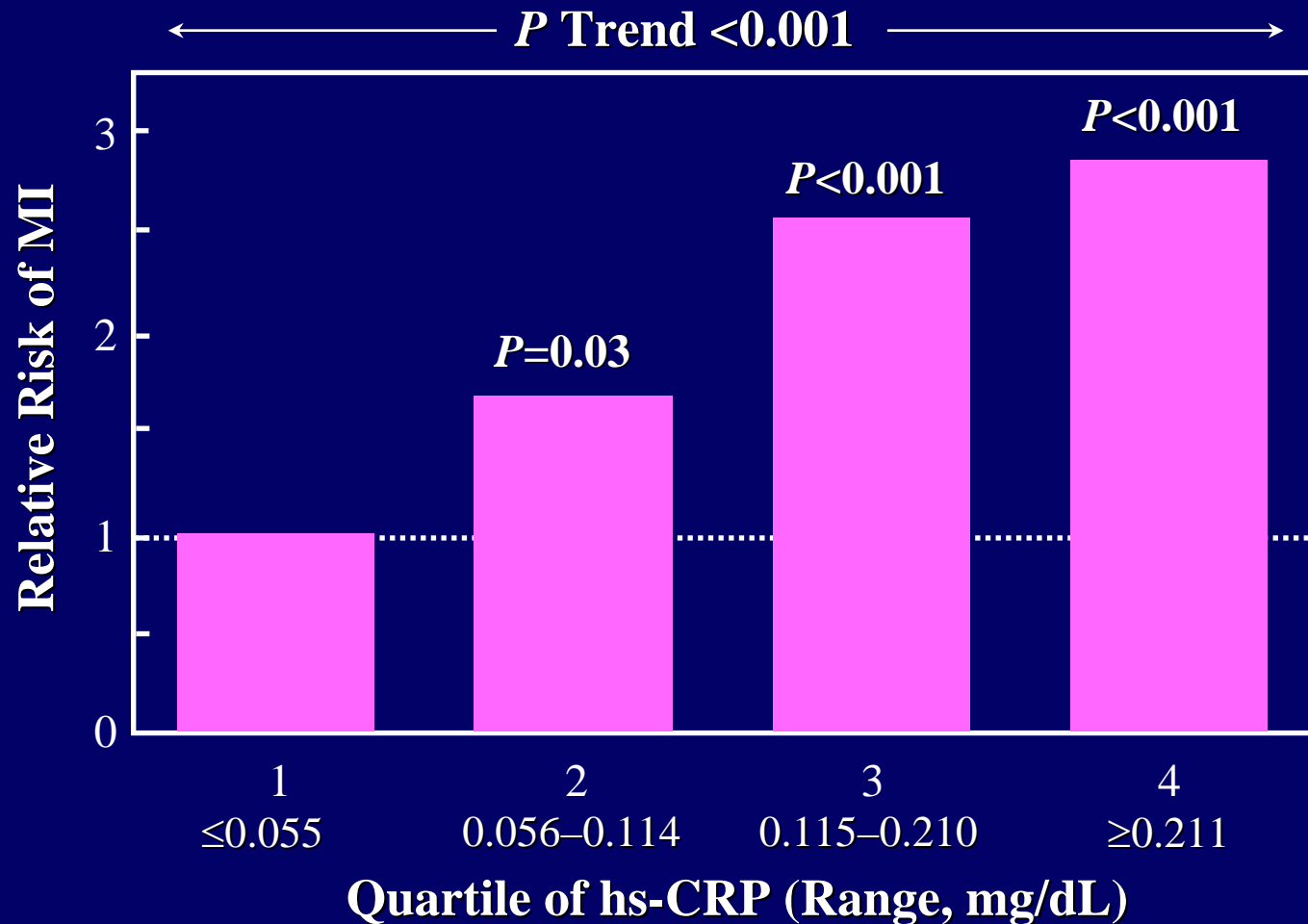
Test

immune system
neuroendocrine
response



END SLIDE

hs-CRP and Risk of Future MI in Apparently Healthy Men



Pathogenesis of atherosclerosis

