

Pregnancy Methyl Donor Nutrients, Homocysteine and Child Health and Development

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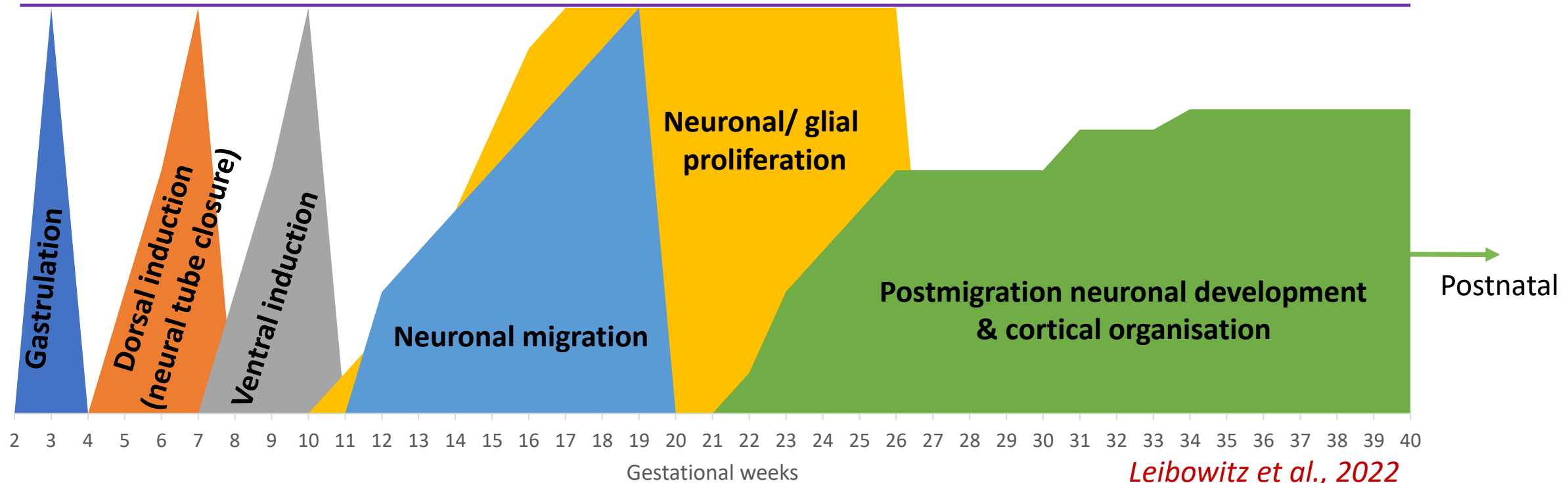
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Timing of human CNS development during pregnancy

Completion of developmental stage



Sequential & overlapping stages
Rapid cell division
Short period of time



Blueprint for lifelong
cognitive performance

The Reus Tarragona Birth Cohort study

Participating University Hospitals



Sant Joan, Reus



Joan XXIII, Tarragona

Summary points

- Folate and B12 status are not routinely monitored in pregnancy
- Maternal status in these has lasting associations with cognitive performance in the offspring
- None of the mothers in the RTBC were vegan, only 2 were vegetarian

PREC- Study N = 84 mother-child dyads followed from preconception to 6 years

Preconception tHcy tertile

Tertiles	tHcy ¹ (μmol/L)
High	11.2 (9.2, 13.7)
Medium	7.2 (5.4, 8.9)
Low	



Probability of child score in the lowest tertile, OR (95% CI) When maternal tHcy is in the highest vs low-mid tertiles

	4 Months	6 years
Bayley Scales		
ID		
Psychomotor	4.8 (1.1, 19.8)	
WPPSI		
Verbal IQ		6.5 (1.5, 28.1)
Non-verbal IQ		3.6 (0.9, 14.8)
Total IQ		5.4 (1.4, 21.4)

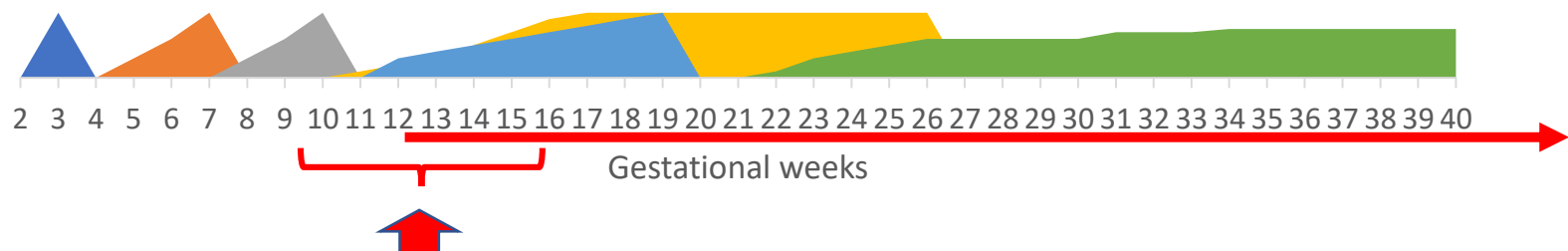
¹Geometric mean (P_{10} , P_{90})

Bhaktapur Nepal, Lancet 2023

Plasma B12 (< 148 pmol/L) in placebo (32%) and supplemented (34%) groups

~70% of each group were B12 insufficient (< 221 pmol/L)

N= 800



50 µg Vit B12 vs. placebo
BSID-III composite scores in the offspring

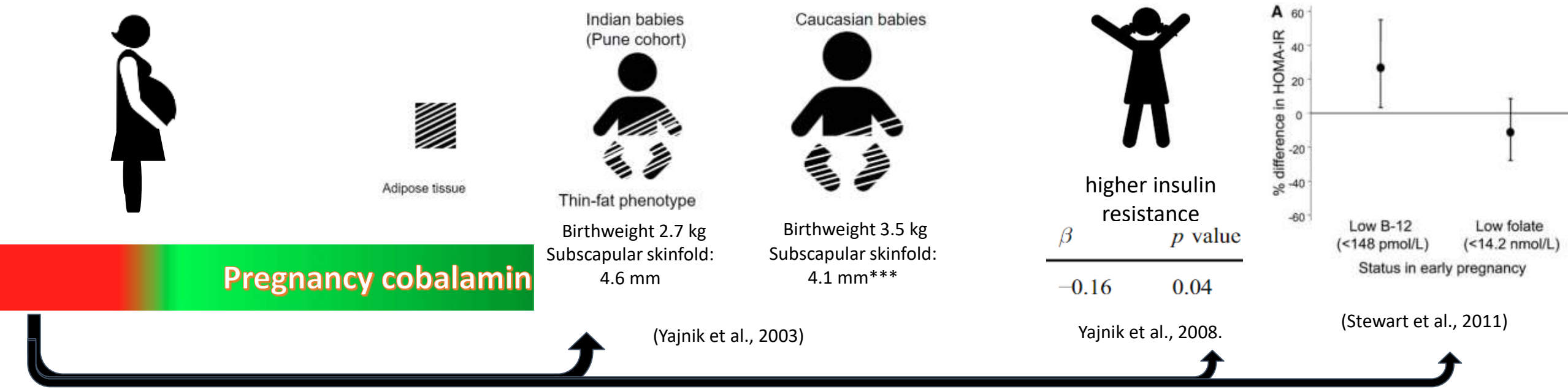
	6 months		12 months	
	Vit B12	Placebo	Vit B12	Placebo
Cognitive	100.1 (10.1)	98.9 (10.7)	95.4 (10.4)	95.3 (9.2)
Language	88.3 (8.0)	88.9 (7.5)	77.2 (12.2)	76.7 (11.3)
Motor	99.8 (13.1)	99.6 (13.7)	93.8 (11.1)	94.0 (12.0)
Socioemotional	100.6 (17.5)	101.2 (16.6)	100.1 (17.5)	100.3 (15.9)
Grave fetal outcome	90/400 (22.5%)	66/400 (16.5%)*		
Congenital anomaly	12/377 (3.2%)	6/383 (1.6%)*		

“Our findings support the current WHO recommendations of no routine vitamin B12 supplementation during pregnancy”

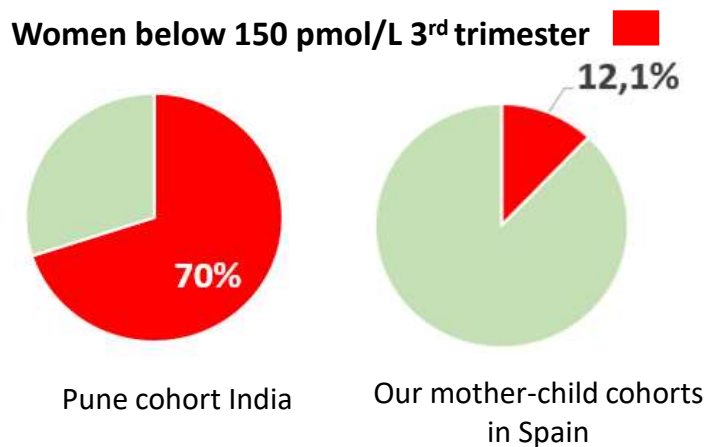
Timing of start point?
Timing of end point?
Dose of B12?

Maternal cobalamin and offspring health - Background

Populations where cobalamin deficiency is endemic



What happens in other populations where cobalamin status is higher?



First trimester folate and B12 status and health and development in the offspring

- Plasma folate
- Red blood cell folate
- Total plasma B12

Microbiological assays at median 9 GW

- tHcy
- HoloTC
- MMA

Functional markers of B12 status at median 9 GW

- Metabolic Score*
- zFat Mass Index
- zHOMA-IR
- WISC-V at 7.7-8 y

In children at 7.5-8 y

* zFMI + dyslipidaemia (zTG-zHDLc/2) + zHOMA-IR

Summary points

- Folate and B12 status are not routinely monitored in pregnancy
- Maternal status in these has lasting associations with cognitive performance in the offspring
- The association between maternal B12 status and offspring development is not limited to Asian countries or to vegetarian mothers
- None of the mothers in the RTBC were vegan, only 2 were vegetarian



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Reus Tarragona Birth Cohort participants!