

## Riboflavin, *MTHFR* 677C→T and blood pressure in pregnant and non-pregnant women

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High blood pressure can compromise the successful outcome of any pregnancy and contribute to increased risk of cardiovascular disease in women in later life. Several meta-analyses have reported that the common 677C→T polymorphism in the *MTHFR* gene is associated with an increased risk of hypertension in pregnancy.<sup>(1,2)</sup> Previous trials from this centre in non-pregnant hypertensive adults have shown a blood pressure lowering response to riboflavin supplementation that is specific to those with the *MTHFR* 677TT genotype<sup>(3)</sup>. To date this relationship has not been examined in relation to pregnancy. Therefore, the aim of this study was to investigate the *MTHFR* 677C→T polymorphism and its interaction with riboflavin in pregnant and non-pregnant women.

Data for this study were generated from two existing cohorts, namely the Irish National Adult Nutrition Survey (NANS) and participants from a trial of Folic Acid Supplementation in the Second and Third Trimester (FASSTT) in pregnancy. In both cohorts, samples were analysed for *MTHFR* genotype and riboflavin biomarker status (erythrocyte glutathione reductase coefficient; EGRac).

In the NANS cohort (n = 1500), among non-pregnant women of reproductive age, those with the *MTHFR* 677TT genotype compared to the CC genotype had a significantly higher mean ± SD systolic (117.2 ± 13.5 vs 110.5 ± 11.6 mmHg; P = 0.002) and diastolic (78.3 ± 11.4 vs 73.3 ± 9.6 mm Hg; P = 0.003) blood pressure. Riboflavin status was found to influence blood pressure only in the TT genotype, whereas in CC and CT genotype groups, there was no significant effect of riboflavin on blood pressure (figure 1).

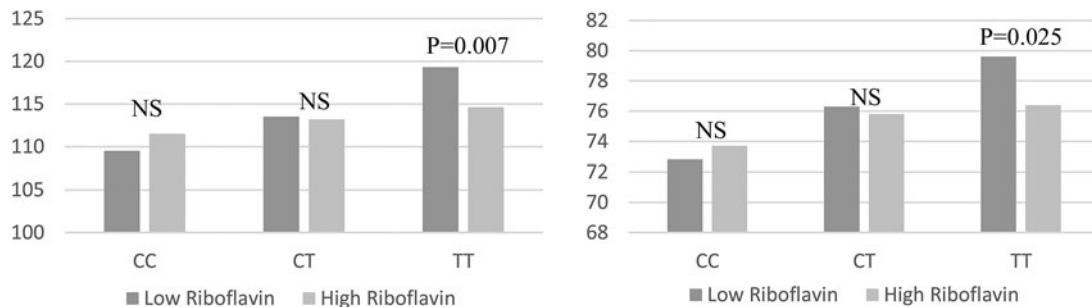


Fig. 1. Systolic (left) and Diastolic (right) blood pressure in non-pregnant women of reproductive age split by riboflavin status.

When pregnant women from the FASSTT trial (n = 226) were examined at the 14<sup>th</sup> gestational week (GW), those with the TT genotype compared those with CC/CT genotypes were found to have significantly higher blood pressure (not shown). In addition, the TT genotype group showed a greater increase in mean ±SD blood pressure from the 14<sup>th</sup> to the 36<sup>th</sup> GW (increase in diastolic blood pressure of 11.0 ± 7.9 vs 4.2 ± 11.1mmHg; P = 0.013; data not shown).

These results suggest that the *MTHFR* 677TT genotype adversely influences blood pressure in women of reproductive age and during pregnancy. A higher riboflavin status can however attenuate the effect of this genetic variant on blood pressure. A randomised controlled trial in pregnant women is necessary to investigate the effect of riboflavin on blood pressure during pregnancy in women stratified by *MTHFR* genotype and such a study is underway at our centre.

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