**Supplementary material**

**Table S1.** Pairwise Pearson’s correlations between the four SNPs in the *CYP2R1* gene

|  |  |  |  |
| --- | --- | --- | --- |
| Pearson’s r | rs10500804 | rs10741657 | rs1562902 |
| rs10741657 | −0.6874 |  |  |
| rs1562902 | −0.7161 | 0.7114 |  |
| rs10766197 | 0.8644 | −0.5256 | −0.7957 |

**Table S2.** Pairwise Pearson’s correlations between the two SNPs in the *DHCR7*/*NADSYN1* gene

|  |  |
| --- | --- |
| Pearson’s r | rs12785878 |
| rs3829251 | 0.6844 |

**Table S3.** Pairwise Pearson’s correlations between the four SNPs in the *GC* gene

|  |  |  |  |
| --- | --- | --- | --- |
| Pearson’s r | rs2282679 | rs842999 | rs4588 |
| rs842999 | 0.6546 |  |  |
| rs4588 | 0.9862 | 0.6548 |  |
| rs7041 | 0.7304 | 0.9371 | 0.7334 |

**Table S4.** Genotyping results for rs7041 and rs4588 and allocation to combined *GC* genotypes (n=625)

|  |  |  |  |
| --- | --- | --- | --- |
| Combined genotype | Genotype rs7041 | Genotype rs4588 | n |
| GC1s-1s | GG | CC | 205 |
| GC1s-1f | TG | CC | 100 |
| GC1f-1f | TT | CC | 13 |
| GC2-1s (or GC1f-x) | TG | CA | 188 |
| GC2-1f | TT | CA | 67 |
| GC2-2 | TT | AA | 52 |
|  |  |  |  |
| GC1s-x | GG | CA | 0 |
| GCx-x | GG | AA | 0 |
| GC2-x | TG | AA | 0 |

The 4th possible allele (haplotype) beside the common Gc1s, Gc1f, and Gc2 is denoted as Gcx. This haplotype was not present in the sample of children. For children heterozygous in both SNPs (CA in rs4588, TG in rs7041), where phase cannot be determined, Gc2-1s phased combined genotype was assumed(39)

**Table S5.** P-values for the SNP and season interaction effect

|  |  |
| --- | --- |
|  | Pinteraction.1 |
| *CYP2R1* |  |
| rs105008042 | 0.64 |
| rs10741657 | 0.17 |
| rs1562902 | 0.98 |
| *GC* |  |
| rs45883 | 0.36 |
| rs70414 | **0.044** |

*CYP2R1* cytochrome P450 subfamily IIR1, *GC* group-specific complement, MVPA moderate-to-vigorous physical activity, SNP single nucleotide polymorphism (ordered by position).

1 P-value depicts the SNP and season interaction effect in analyses conducted with serum 25(OH)D concentrations across the school year (three repeated measurements in each child (in autumn, winter, and spring, respectively)) adjusted for school, grade, class, and subject as random effects and parental education, intake of supplements containing vitamin D (days with supplement intake/total number of days of dietary recording), MVPA, outdoors walks between classrooms, immigrant/descendant background (yes/no), white ethnicity (yes/no), gender, age, dietary vitamin D intake, BMI-for-age, season, the original study intervention, and order of intervention as fixed effects. 2Pairwise Pearson correlation between *CYP2R1* rs10500804 and rs10766197 (r=0.8644); therefore, only rs10500804 included. 3Pairwise Pearson correlation between *GC* rs2282679 and rs4588 (r=0.986); therefore, only rs4588 p-values included. 4Pairwise Pearson correlation between *GC* rs842999 and rs7041 (r=0.937); therefore, only rs7041 p-values included.