

ビタミンD結合タンパクに影響する遺伝子多型が血清ビタミンD(25[OH]D3)と食物アレルギーとの関係を修正する

背景

ビタミンD不足が食物アレルギーと関連しているというエビデンスが増加している。ビタミンD結合タンパク (DBP)低下が血清ビタミンD 生物学的活性を増加させる。遺伝的多型が結合タンパクの変化の80%を説明出来る。

目的

DBP の低下が食物アレルギーにおける血清ビタミンD 低下による悪影響を代償することが出来るかについて調べた。

方法

集団ベース研究(n=5276)より血清 serum 25-hydroxyvitamin D3 (25[OH]D3) と1歳時の食物アレルギー (負荷試験で証明した 338名の食物アレルギーと 269名のコントロール) と2歳時 (55名の持続した食物アレルギーと寛解した 50名) との関連について調べた。液体クロマトグラフィータンデムマススペクトロメトリーにて 25(OH)D3 値を測定し、季節で補正した。解析は DBP 代理のマーカーとして rs7041 のゲノム型によって層別化した (low, the GT/TT genotype; high, the GG genotype)。

結果

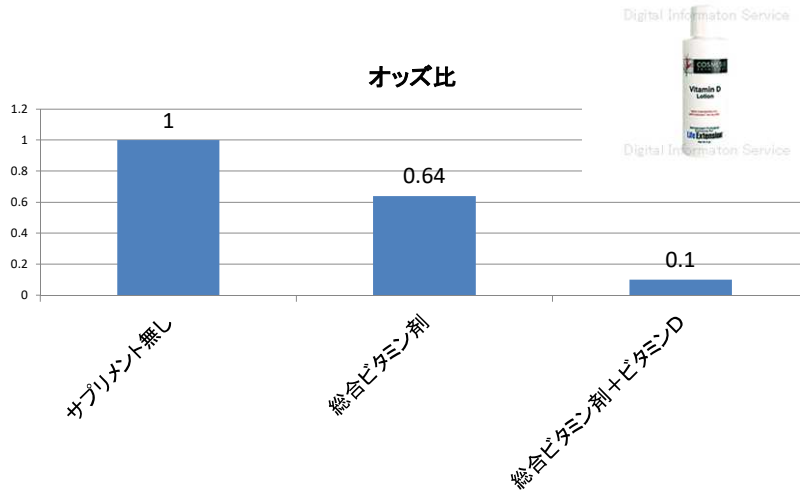
1歳時の低血清 25(OH)D3 level (≤ 50 nM/L) 値は食物アレルギーと関連した。特に GG ゲノム型の乳児で(オッズ比 [OR], 6.0; 95% CI, 0.9-38.9) 、しかし GT/TT ゲノム型では関連しなかった (OR, 0.7; 95% CI, 0.2-2.0; P interaction = .014)。母親の出生前のビタミンDサプリメントは食物アレルギーの減少と関連した、特に GT/TT ゲノム型 (OR, 0.10; 95% CI, 0.03-0.41)。持続的なビタミンD不足は持続的食物アレルギーを増加させ(OR, 12.6; 95% CI, 1.5-106.6)、特に GG ゲノム型においてみられた。

結論

DBP 値の低下と関連した遺伝的多型は低血清 25(OH)D3 と食物アレルギーとの関連を弱めた。そのことは低 DBP を伴ったビタミンD生物学的活性が高くなることと一致する。これは食物アレルギーにおけるビタミンDの役割をうまく説明できる。

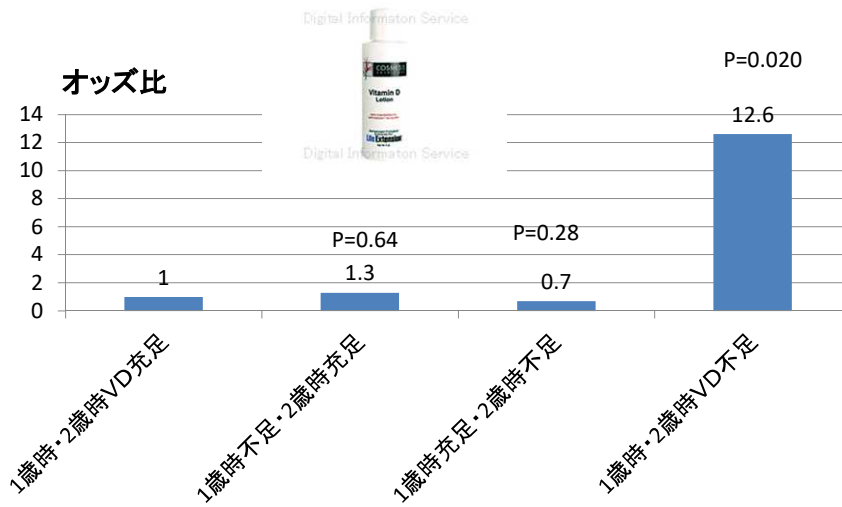
妊娠中の総合ビタミン剤・ビタミンDと1歳時の食物アレルギーオッズ比

Koplin JJ Polymorphisms affecting Vitamin D-binding protein modify the relationship between serum Vitamin D (25[OH]D3) and food allergy JACI 2016 137 500-6.



1歳時・2歳時のビタミンDと2歳時の鶏卵アレルギーオッズ比

Koplin JJ Polymorphisms affecting Vitamin D-binding protein modify the relationship between serum Vitamin D (25[OH]D3) and food allergy JACI 2016 137 500-6.



食物アレルギーのある人はビタミンDのサプリメントとしての摂取が、食物アレルギーを改善する可能性がある

Polymorphisms affecting vitamin D-binding protein modify the relationship between serum vitamin D (25[OH]D3) and food allergy

- [J Allergy Clin Immunol](#). 2016 Feb;137(2):500-506.e4. doi: 10.1016/j.jaci.2015.05.051. Epub 2015 Aug 7.
- Polymorphisms affecting vitamin D-binding protein modify the relationship between serum vitamin D (25[OH]D3) and food allergy.
- [Koplin JJ](#)¹, [Suaini NH](#)², [Vuillermine P](#)³, [Ellis JA](#)², [Panjari M](#)⁴, [Ponsonby AL](#)², [Peters RL](#)², [Matheson MC](#)¹, [Martino D](#)², [Dang T](#)⁴, [Osborne NJ](#)⁵, [Martin P](#)⁴, [Lowe A](#)¹, [Gurrin LC](#)¹, [Tang ML](#)⁶, [Wake M](#)⁷, [Dwyer T](#)⁴, [Hopper J](#)⁸, [Dharmage SC](#)¹, [Allen KJ](#)⁹; [HealthNuts Study](#).
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- **Abstract**
- **BACKGROUND:**

- There is evolving evidence that vitamin D insufficiency may contribute to food allergy, but findings vary between populations. Lower vitamin D-binding protein (DBP) levels increase the biological availability of serum vitamin D. Genetic polymorphisms explain almost 80% of the variation in binding protein levels.
- **OBJECTIVE:**
- We sought to investigate whether polymorphisms that lower the DBP could compensate for adverse effects of low serum vitamin D on food allergy risk.
- **METHODS:**
- From a population-based cohort study (n = 5276) we investigated the association between serum 25-hydroxyvitamin D3 (25[OH]D3) levels and food allergy at age 1 year (338 challenge-proven food-allergic and 269 control participants) and age 2 years (55 participants with persistent and 50 participants with resolved food allergy). 25(OH)D3 levels were measured using liquid chromatography-tandem mass spectrometry and adjusted for season of blood draw. Analyses were stratified by genotype at rs7041 as a proxy marker of DBP levels (low, the GT/TT genotype; high, the GG genotype).
- **RESULTS:**
- Low serum 25(OH)D3 level (≤ 50 nM/L) at age 1 years was associated with food allergy, particularly among infants with the GG genotype (odds ratio [OR], 6.0; 95% CI, 0.9-38.9) but not in those with GT/TT genotypes (OR, 0.7; 95% CI, 0.2-2.0; P interaction = .014). Maternal antenatal vitamin D supplementation was associated with less food allergy, particularly in infants with the GT/TT genotype (OR, 0.10; 95% CI, 0.03-0.41). Persistent vitamin D insufficiency increased the likelihood of persistent food allergy (OR, 12.6; 95% CI, 1.5-106.6), particularly in those with the GG genotype.
- **CONCLUSIONS:**
- Polymorphisms associated with lower DBP level attenuated the association between low serum 25(OH)D3 level and food allergy, consistent with greater vitamin D bioavailability in those with a lower DBP level. This increases the biological plausibility of a role for vitamin D in the development of food allergy.