[연수강좌]

조 은 진

파마코디자인

개 요

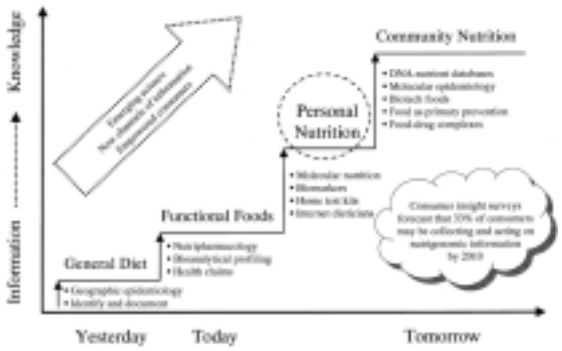
Nutrigenomics, nutrigenetics (genomics) (nutritional science), (medicine) , , . (Human Genome Project; HGP) , , . (pharmacogenomics) . , (genotype) (nutritional bioactives) . – (gene-nutrient interaction) - .. (gene expression) .(nutrigenomics) (polymorphism of genotype) .(nutrigenetics) , (Dr. Ronald M. Krauss) " " LDL , . LDL- A B . A LDL- , B LDL- . LDL- . B . . , B LDL( ) . A , A , , . , B (Elliot V, 2001). , . 

그림 1. 영양학의 발달 단계 (출처: Supplement to the Journal of the American Dietetic Association. December 2003 Suppl 2 Volume 103 Number 12)

(functional foods)

(genotype)
. ,
,
3 : (a)
(b)
(c)
(新) .

33% 2010
.[1)]

영양유전체학과 영양유전학: 정의와 구분

(nutritional genomics)
(nutrigenomics) ,
nutrigenomics
,
nutrigenetics,
.

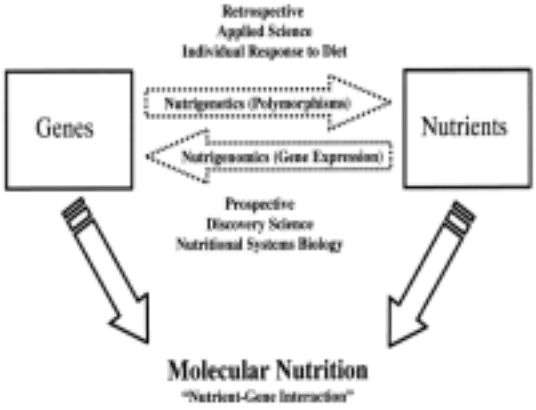


그림 2. nutrigenetics와 nutrigenomics와의 차이 (출처: Supplement to the Journal of THE AMERICAN DIETETIC ASSOCIATION,December 2003 Suppl 2 Volume 103 Number 12)

2 , nutrigenomics
(3) (gene expression) .
(nutrigenomics) RNA
(microarray)
(bioinformatics) .[4,5)] ,
nutrigenetics
(genetic variation)
(genetic polymorphisms)
.
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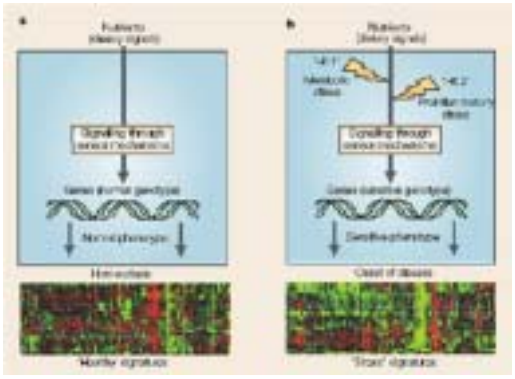

그림 3. 영양소 섭취에 따른 유전자 발현 패턴을 연구하는 Nutrigenomics (출처 : Genetics, 2003 April, Vol. 4, p.317)

,
(genetic polymorphisms)
(genotype)
.
,
.

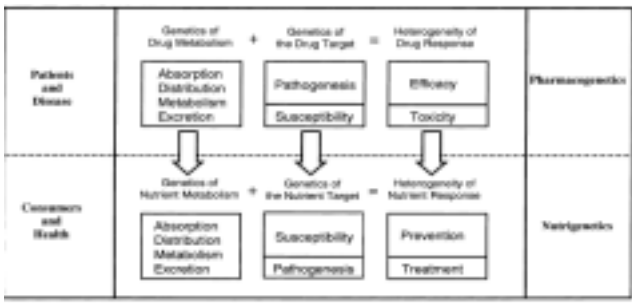

그림 4. PHARMACOGENOMICS와 NUTRIGENOMICS 와의 차이(출처: Supplement to the Journal of THE AMERICAN DIETETIC ASSOCIATION,December 2003 Suppl 2 Volume 103 Number 12)

4

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.

, Gleevec(Novartis, Basel, Switzerland) Herceptin (Genetech, San Francisco, CA)

.[6]

, phenylalanine-restricted tyrosine galactose-free type-1 galactosemia(galactose 1-phosphate uridyltrasferase) .[7,8]

.

. , apolipoprotein E

, Cognex [9] E [10] marker . apolipoprotein E

.

단일염기다형성(SNP)의 중요성

SNP(, Single Nucleotide Polymorphism) .

SNP ‘ single base allele 1% nucleotide level (polymorphism)’ (Silber, 2001). SNP marker marker marker

, ,

, , ,

nutrigenetics .

SNP marker .

, DNA 1.91 Kb , 1.80 Kb 1 SNP .[11]

SNP , SNP ?

. SNP

SNP

:

1. .
2. .
3. .

,

SNP ,

.

methylenetetrahydrofolate reductase(MTHFR) interleukin 1(IL-1) . MTHFR (coding) , IL-1 (uncoding) . MTHFR SNP coding SNP substrate cofactor Km .[12] MTHFR 677C->T 222 FAD Km .[13] MTHFR TT 10%~20% . MTHFR

,

. MTHFR TT Michaelis-Menton Km

. UNCODING SNP DNA . IL-1β -31 “ (gain-of function)” (polymorphism) IL-1β .[15,16] IL-1 (IL-1 α IL-1 β) - (IL-1 ra) .[17]

IL-1 long-chin n-3 polyunsatrated fatty acids [18,19] C-

.[20]

SNP

(genotype) ,

.

.

.

SNP

, .

DLAT [21],

" , " ILSI [22]

. [24]

[23]

Functional Foods Against Colorectal Cancer

.[25]

[23] DNA BANK[27]

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미래에 대한 기대

.

nutrigenetics nutrigenomics ,

SNP

.

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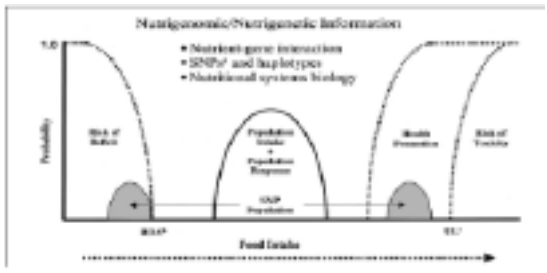

그림 5. 현 시점에서 nutrigenetic와 nutrigenomics 전략 (SNP : single nucleotide polymorphism, RDA: Recommended Dietary Allowance, UL: Upper limits)

결 론

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, - (mass-market) -

(mass-customization)

.

Peter Medaw

.[28]

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