



기능성 식품의 현황 및 개발전략

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기능성 식품산업의 특징

- ⊙ 식품의 영양기능과 의약품의 약리기능을 접목한 신산업군
- ⊙ 전통 식품산업에 새로운 제품 concept 제공 및 신시장 창출
- ⊙ 소비자의 건강지향적 제품 구매경향에 부응하는 제품
- ⊙ 생명공학 기술의 가장 신속한 응용 가능성 산업분야로 인식
- ⊙ 상품화를 위한 다학제간 접근(multi-disciplinary approach) 필요성
- ⊙ 식품, 의약품, 화장품의 fusion market에서 가장 주축이 되는 사업분야

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Issues in Functional Foods

- ⊙ Legal questions (legal documentation, claims, clarity in labelling patent protection)
- ⊙ Scientific proof of efficacy
- ⊙ Competition with a balanced diet
- ⊙ Correct dose
- ⊙ Influence on the basic character of food
- ⊙ Performance of the active ingredient in food (stability, degradation products, etc)
- ⊙ Acceptance problem(e.g. taste)
- ⊙ Value addition (plant variety, technology, product)
- ⊙ Marketing channels (mainstream, mass market or niche)
- ⊙ Correct (and innovative) consumer communication
- ⊙ Reasonable pricing to perform in mainstream markets
- ⊙ Long-term consumer compliance and product loyalty



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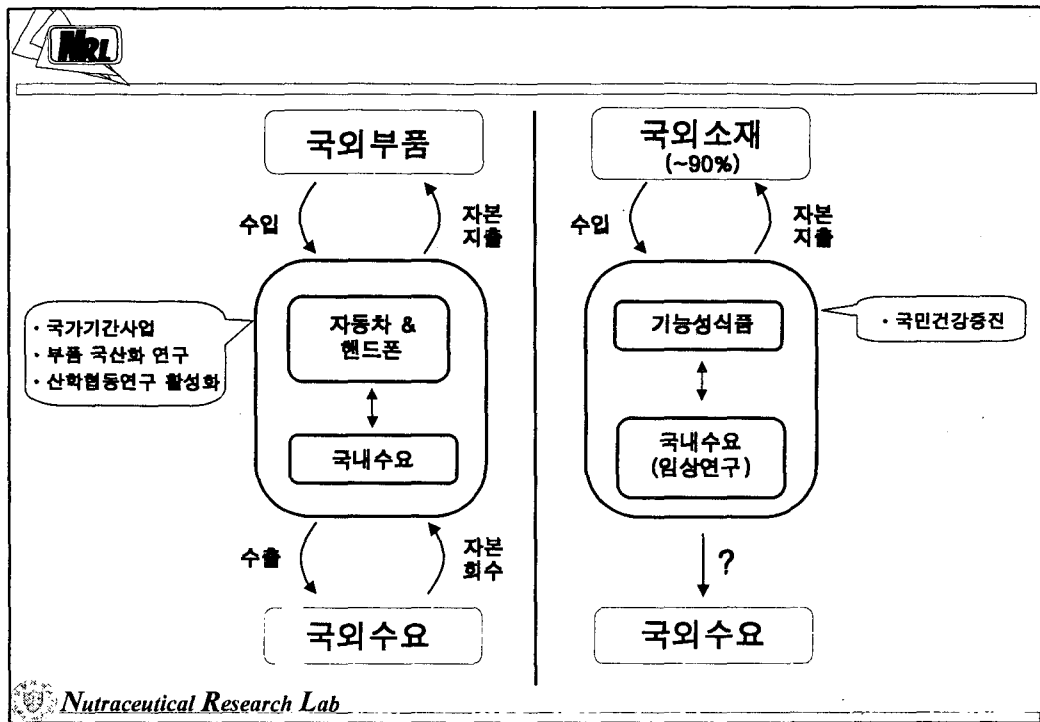
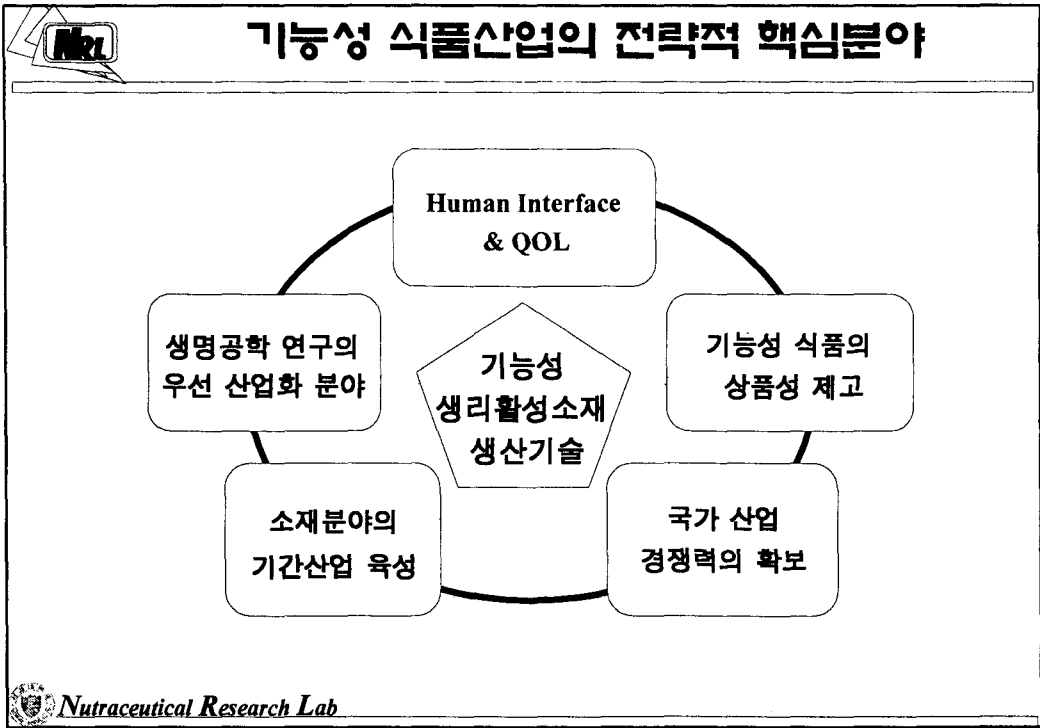


Successful Strategies for Functional Foods

- Functional food “make-over”
- “First mover” enrichment
- Substitution by a new product
- Category substitution
- Incremental sales in existing markets
- Introduction of a new category
- Leveraging hidden nutritional assets




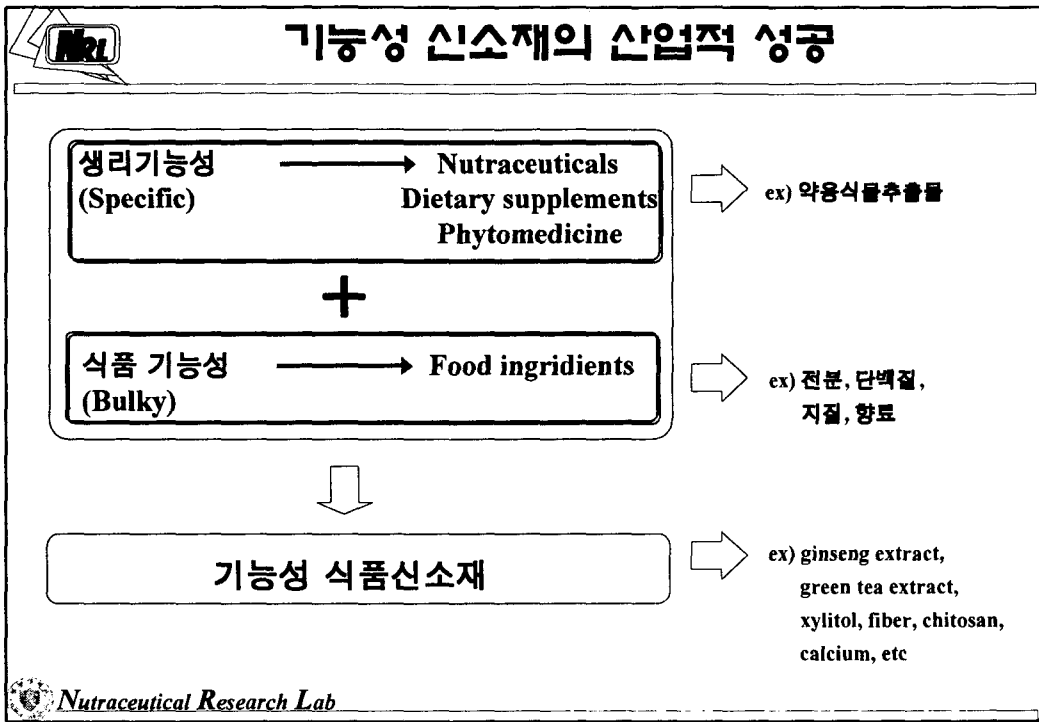
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MRU **대표적인 국내 생산 기능성 식품소재**

- 알로에
- 유산균
- 클로렐라
- 키토산 & 키토산 올리고당
- Green tea extract
- Ginseng extract (saponin)
- 기능성 지질 (sphingolipid, 인지질 등)

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약용식물 유래의 생리활성소재 개발

장 점

- 특정 질환에 대한 약리활성 phytochemicals 다량함유
- 생체지표(Biomarker)에 대한 맞춤형 식의약품 설계
- 2차 대사산물의 조절을 위한 plant genomics의 산업적 활용분야
- 의약품, 화장품, 생활용품 등 관련 산업분야에 적용 가능성
- Herbs-in-Foods 개념의 식품에 대한 소비자의 인지도 제고

문제점

- Extract 성분의 synergistic effect
- 신물질 및 신규 선도물질 발굴 가능성
- 고시장성 산업 재산권 획득 가능성



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Categories of Botanical Function Food Ingredients

- ⊙ Antioxidants
- ⊙ Antimutagenic and anticarcinogenic agents
- ⊙ Antimicrobial and antiviral substances
- ⊙ Enhancers of the gastrointestinal function
- ⊙ Immune modulators and stimulators
- ⊙ Inflammation-inhibiting substances
- ⊙ Cognitive enhancers (psychotropic/neuroregulatory substances)
- ⊙ Oestrogen-modulators
- ⊙ Blood-pressure-reducing agents
- ⊙ Cholesterol-reducing agents
- ⊙ Anti-allergenic
- ⊙ Anti-diabetics



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Case Study

Whole Grain Based Functional Foods

- ⊙ **Integrated approach**
(University, Government & Industry)
- ⊙ **Epidemiology**
- ⊙ **Health claims**
- ⊙ **Public health**
- ⊙ **Industrial success : Global**



Health Claim : Whole Grains

In July 1999, the Food and Drug Administration (FDA) permitted the following health claim that allows qualifying products to promote the potential risk reduction for heart disease and some cancers:

- ⊙ **Diets rich in whole grain foods and other plant foods and low in total fat, saturated fat, and cholesterol may reduce the risk of heart disease and some cancers**A food manufacturer can choose to include the whole grain health claim on a food package if the product:
 - ⊙ **Contains all portions of the grain kernel**
 - ⊙ **Contains 51% whole grain ingredient(s) or more by weight per reference amount customarily consumed**
 - ⊙ **Is low in fat, saturated fat, and cholesterol**
 - ⊙ **Meets the general requirements for health claims**This is the first authorized health claim that specifies whole grains foods in the fight against both chronic diseases in a single health claim. More than 50 scientific studies support the link between a diet rich in whole grain and the reduced risk of hear



Health Benefit of Whole Grains

Contrary to popular perception, the benefits of whole grains go well beyond fiber and fiber's role in digestive health. The health benefits of whole grains come from the whole grain package, not just from the fiber or individual nutrients. Whole grains contain:

⊙ **Vitamins:**

- B vitamins
- Vitamin E

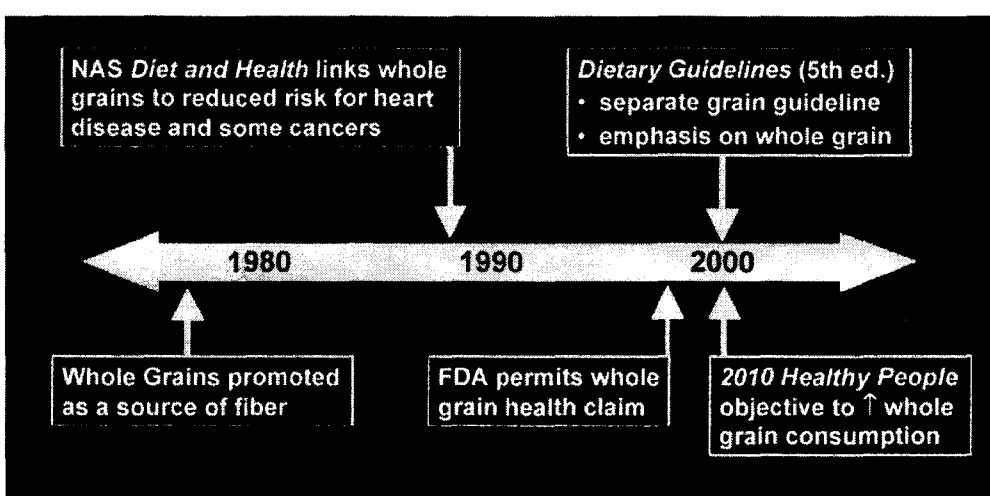
⊙ **Minerals:**

- Magnesium
- Selenium
- Zinc

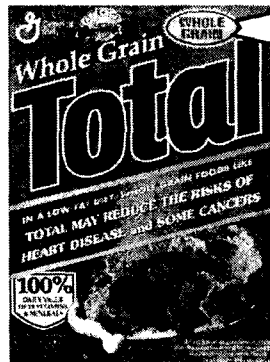
⊙ **Many other important components including:**

- Fiber
- Oligosaccharides
- Flavonoids
- Inositol
- Lignins
- Phenolics
- Phytates
- Phytoestrogens
- Protease inhibitors
- Saponins

Whole Grains: Evolution of Dietary Guidance



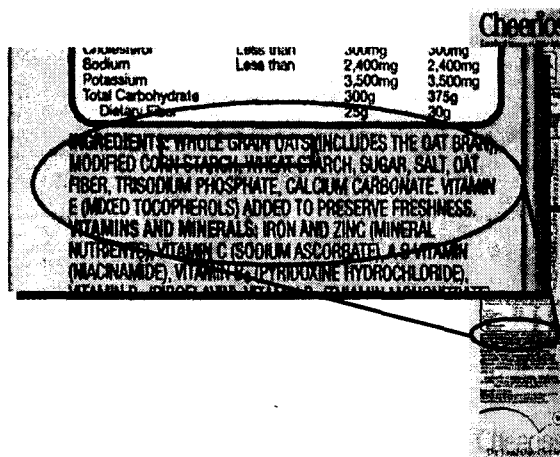
Look for the Whole Grain Seal




WHOLE GRAINS

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Label Reading for Whole Grains




Look for
"Whole Grain"
as a leading
ingredient

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Look for the Health Claim

IN A LOW-FAT DIET, WHOLE GRAIN FOODS LIKE
**TOTAL MAY REDUCE THE RISKS OF
HEART DISEASE and SOME CANCERS**

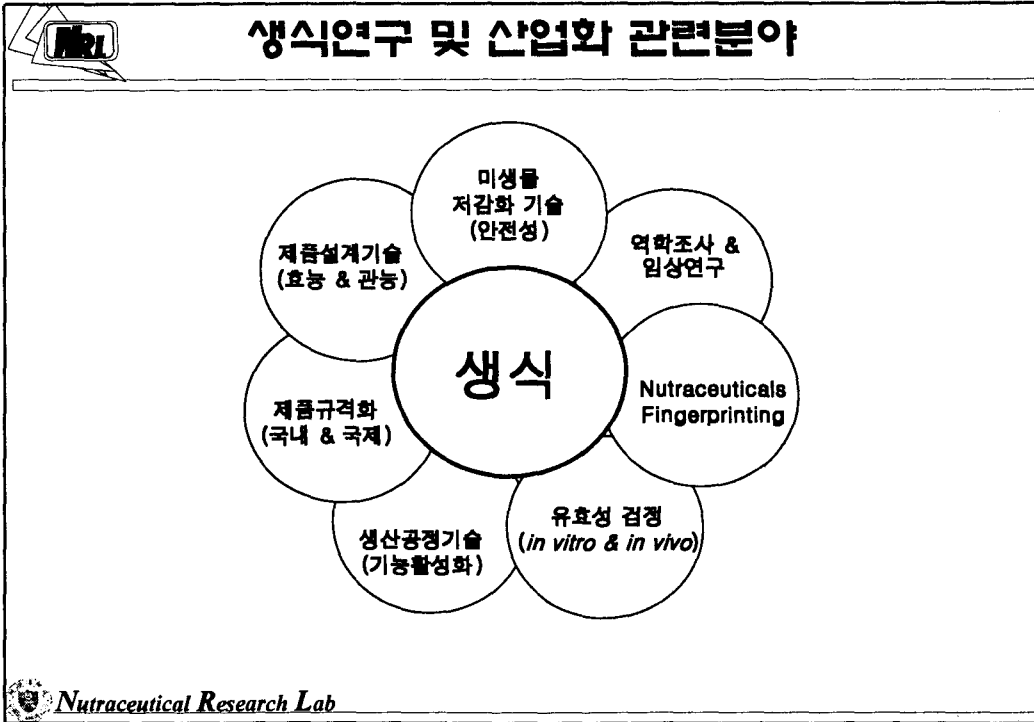
Diets rich in whole grain foods and other plant foods that are low in total fat, saturated fat, and cholesterol may reduce the risks of heart disease and certain cancers.

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Products That Qualify for the Whole Grain Health Claim



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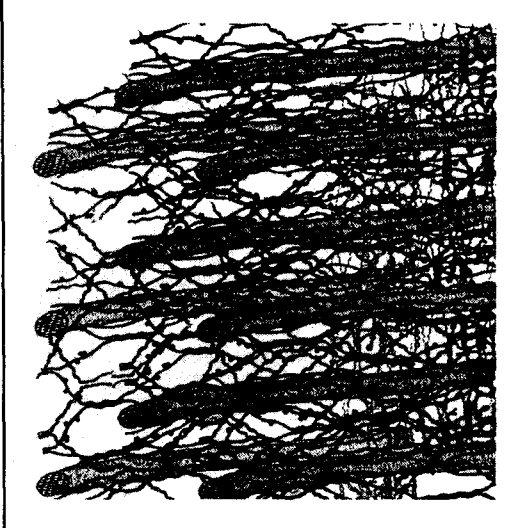


생식의 생리활성 성분

	Cereals & Legumes	Fruits & Vegetables	Mushrooms	Seaweeds
Bioactive Polysaccharides	Arabinoxylan	Pectin	β -Glucan	Fucoidan
Phytochemicals	<ul style="list-style-type: none"> • Phytoestrogen • Phytosterols • Phenolic acids • Phytic acid • Lignan • Saponin 	<ul style="list-style-type: none"> • Polyphenols • Carotenoids • Terpenes • Phytoestrogens • Oganosulphur-compounds 	<ul style="list-style-type: none"> • Alkaloids • Amino acid derivatives • Nucleosides • Polyphenols • Polypeptides 	<ul style="list-style-type: none"> • Chlorophylls • Carotenoids • Phytosterols • Terpenes • Amino acid derivatives

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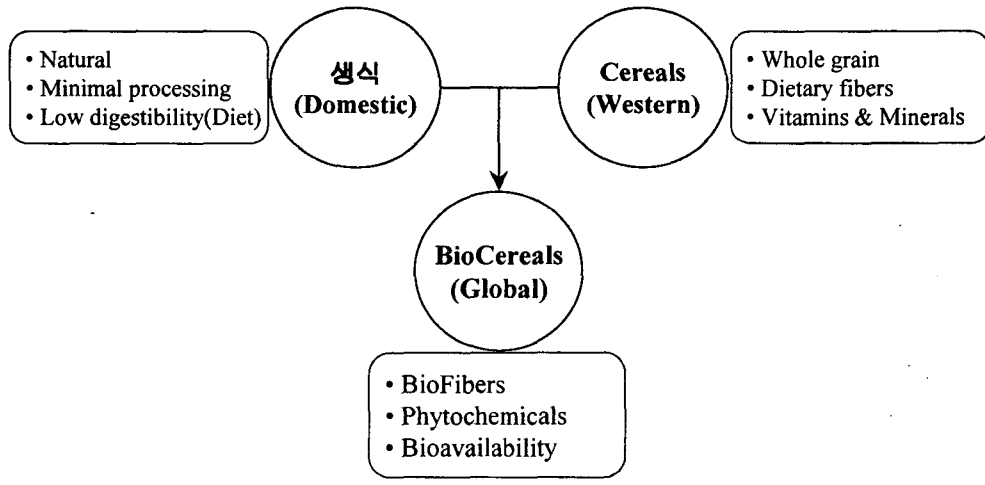
NRL **Cereal Cell Wall Structure**



- **Fibrous**
- **Rigid & Insoluble**
- **Not Accessible to Enzyme**

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NRL **Perspectives in BioCereals**



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    graph TD
      A[생식 (Domestic)] --- B[Cereals (Western)]
      A --> C[BioCereals (Global)]
      B --> C
      C --- D[• BioFibers  
• Phytochemicals  
• Bioavailability]
  
```

- Natural
- Minimal processing
- Low digestibility(Diet)

생식 (Domestic)

- Whole grain
- Dietary fibers
- Vitamins & Minerals

Cereals (Western)

BioCereals (Global)

- BioFibers
- Phytochemicals
- Bioavailability

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NRI **기능성 식품의 연구 및 산업화 활성화 방안**

- 국제적 수준의 학술연구 수행 및 국제협력 연구시스템 구축
- 생명공학의 첨단 platform technology와 전문인력의 과감한 영입
- 외국소재의 단순조합 및 제품 모방기술이 아닌 창조적 상품화 기술개발
- 산학 협력연구의 지속적인 성공사례를 통하여 산업체의 투자유도
- 생명공학 첨단 기반기술과의 interface core technology 개발 및 상품화
- 고기능성 생리활성소재의 생산기술을 확보한 바이오 벤처기업의 발굴
- 정밀화학 수준의 기능성 식품소재 생산기술을 보유한 대기업의 집중육성
- 기능성 식품 및 생리 활성소재의 수출 주도형 산업시스템 구축

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