S&T Policy and Bio-technology in Korea

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S&T Policy : A Brief History in Korea

- The 1960's: The ground-breaking stage
- The 1970's: The growth stage for Korean S & T
- The 1980's: The policy sought to ensure further growth and stabilization
- The 1990's: An era of great change and challenge for Korean S & T
- The 2000's : **"Vision2025"** National Innovation System (NIS)

21C S&T Policy in Korea

- Ministry of Science and Technology (MOST)
  - Minister of MOST upgraded to the Vice Prime Minister (2004)
- National Innovation System (NIS) created
  - Vice Minister level
  - Systemic and sustainable innovation of S & T policy
  - Budgetary control

S&T Policy Directions for the 21st Century

The major directions for S&T development set out in Vision 2025 include:

- Shift the national innovation system (NIS) from government-led to private-led R&D
- Improve the efficiency of R&D investments
- Align the R&D system to global standards
- Meet the challenges and harvest the opportunities presented by new technologies

National R & D programs

- Efficient use of S&T resources based on the principle of "Selection and Concentration"

The current National R&D Programs

- The 21st Century Frontier R&D Program
- The Creative Research Initiative (CRI)
- The National Research Laboratory (NRL)
- The Biotechnology Development Program
- The Nano-technology Development Program
- The Space and Aeronautics Program

... and so on ...

International S&T Cooperation

- **International Joint Research Program**
- 1,896 Joint projects
- **Bilateral Cooperation**

  Asia (12)

  Bangladesh, China, India, Japan, Malaysia, Pakistan, Papua New Guiea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam

  America (11)

  Argentina, Brazil, Chile, Colombia, Costa Rica, Dominica, Mexico, Paraguay, Peru, United States, Venezuela

  Europe & Oceania (17)

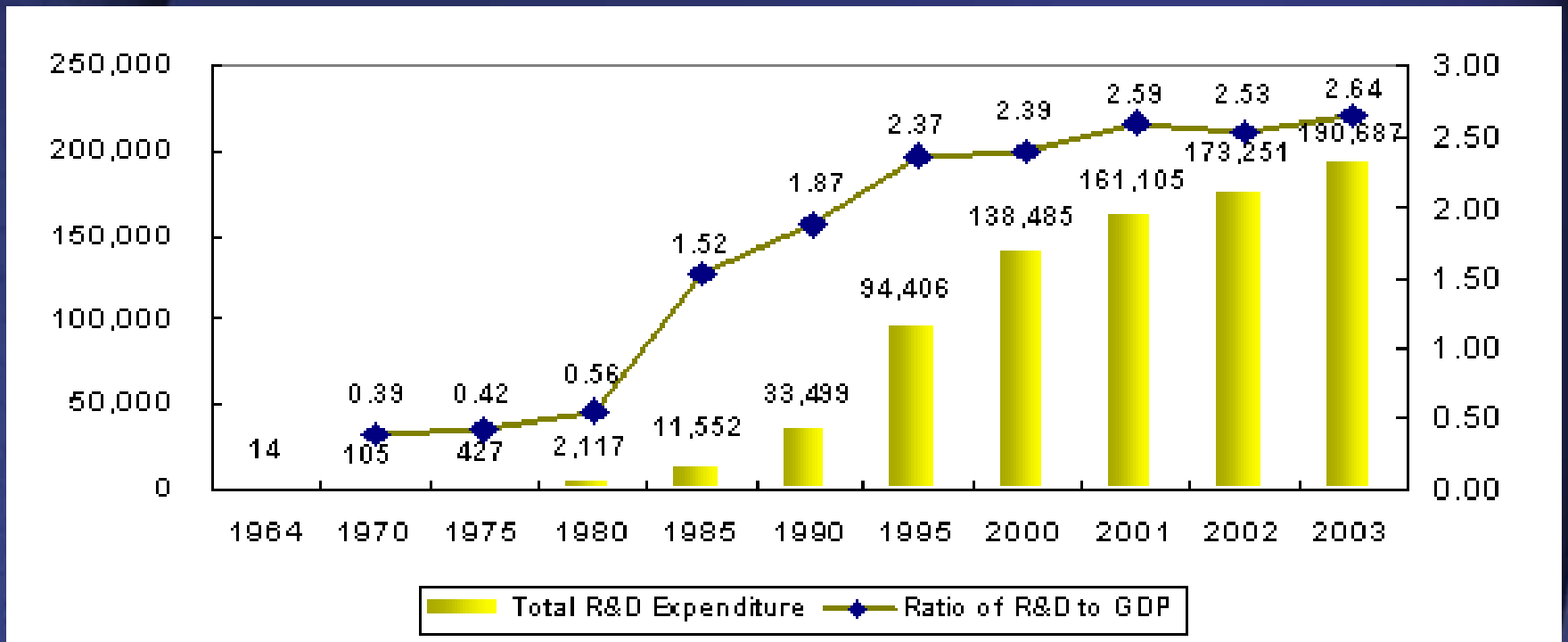
  Albania, Australia, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Kazakhstan, Poland, Russia, Slovenia, Spain, Ukraine, United Kingdom, Uzbekistan

  Middle East & Africa (3)

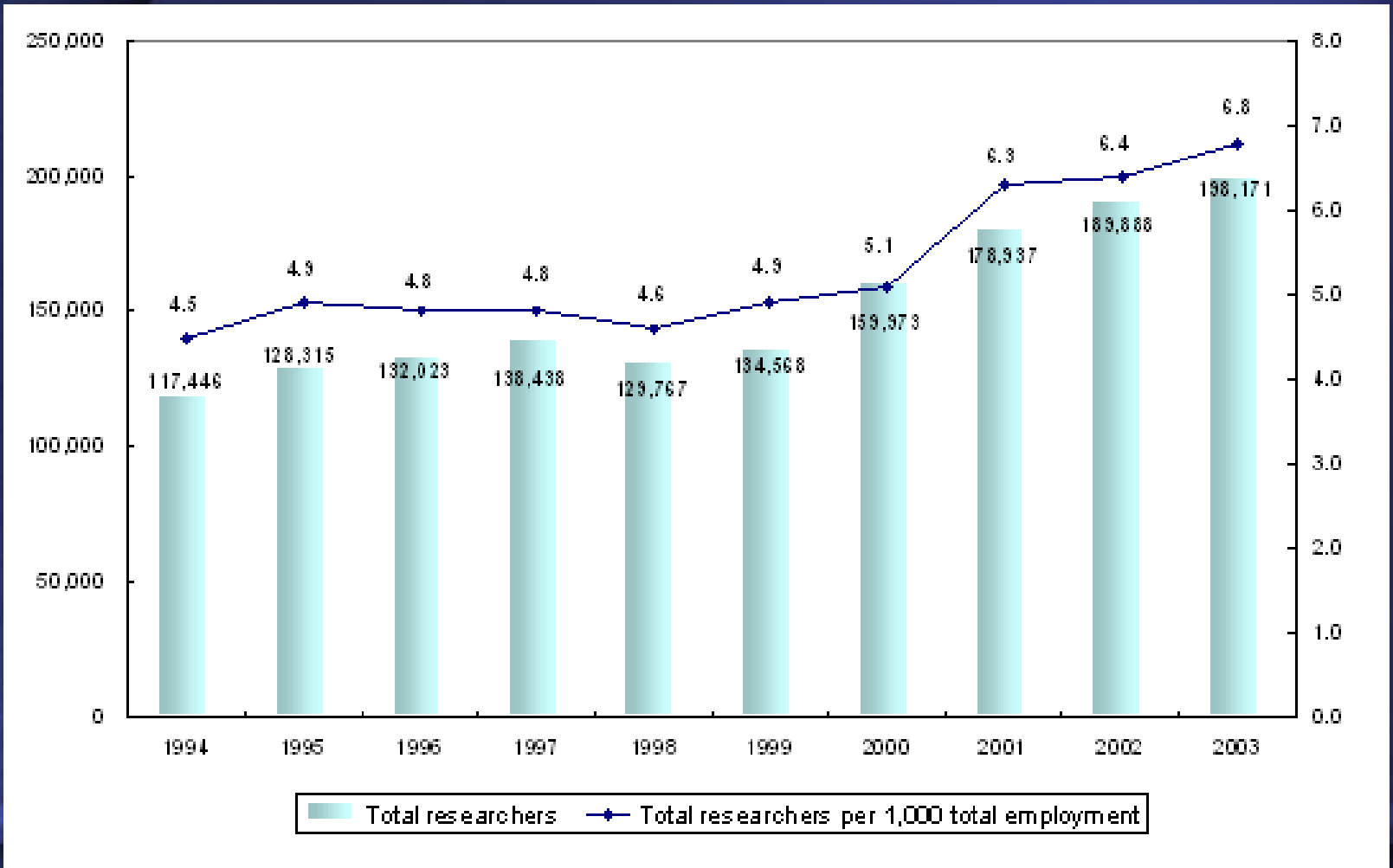
  Egypt, Israel, Tunisia
- **Multilateral Cooperation**

  APEC, OECD, ISTC
- **Inter-Korean Cooperation**

Trend of R & D Expenditure and the Ratio of R & D to GDP



Trend of the number of researchers



High-caliber Manpower and Basic Research

Promote University Research

- Create centers of excellence (COE) with top research capabilities
  - Science Research Centers (SRC)
  - Engineering Research Centers (ERC)
  - Regional Research Centers (RRC)

Produce Scientists and Engineers of Top Quality

- Transform from teaching-oriented into research-oriented
- Support with big research fund ($1M/yr) plus equipment
- Focus on common objectives with interdisciplinary collaboration
- Evaluate every 3rd year (3+3+3 yrs)
- Strengthen international exchanges

The Centers of Excellence (COE)

The Science Research Center (SRC)

- focus on new theories in basic science and in-depth research on natural phenomena

The Engineering Research Center (ERC)

- emphasize developing highly advanced industrial technology

The Regional Research Center (RRC)

- stress cooperative research between regional universities and industry

The cumulative number of SRC/ERC
(1990-2004)

	'90	'91	'94	'95	'97	'98	'99	'00	'01	'02	'03	'04
SRC	6	14	14	17	17	20	26	36	39	43	45	45
ERC	7	16	21	21	28	28	35	47	51	57	59	59
Total	13	30	35	38	45	48	61	83	90	100	104	104

Publication (SRC/ERC)

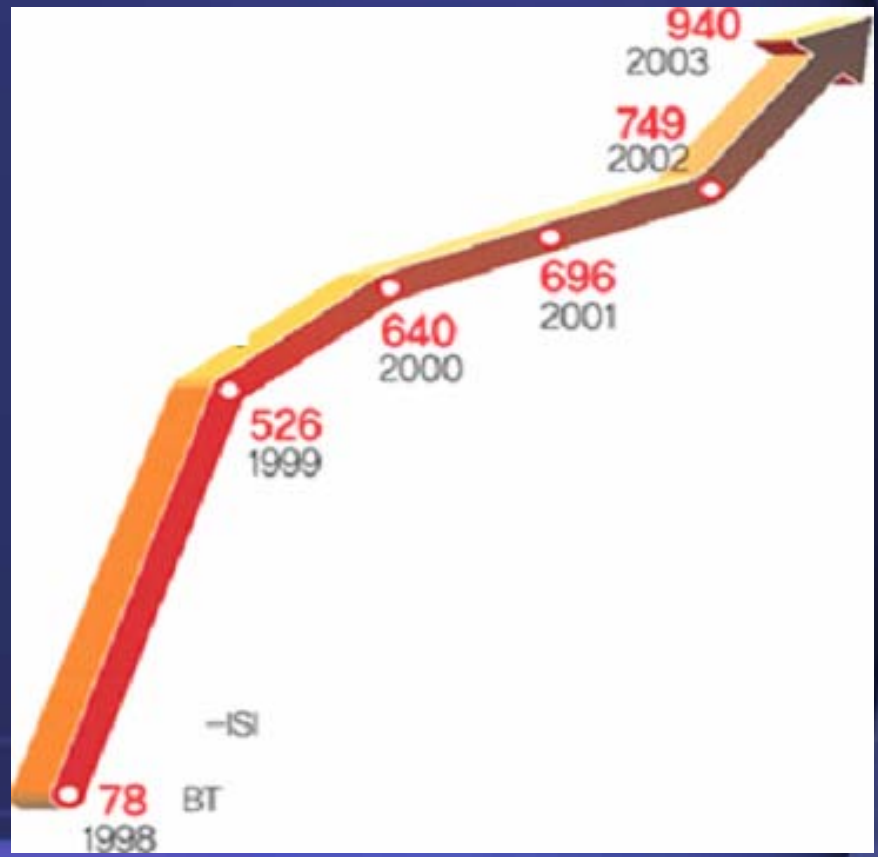
(Unit: Article)

Classification	'99	'00	'01	'02	'03	'04
Domestic Journal	1,707	1,143	1,306	1,181	918	923
SCI Journal	2,178	1,984	2,607	2,822	2,652	2,639
Conference	6,015	4,687	6,704	7,755	8,242	8,727
Total	9,900	7,814	10,617	11,758	11,812	12,289
(Rate of increase%)	(△6.0)	(△21.1)	(35.9)	(10.7)	(0.5)	(4.0)
SCI	2,138	1,927	2,500	2,752	2,648	2,624
(Rate of increase%)	(△7.0)	(△9.9)	(29.7)	(10.1)	(△3.8)	(△0.9)

Trend of number of SCI publication by Korean researchers

Firsts in the World

- Embryonic stem cell
- Senescence regulatory protein
- Cancer suppressor
- Immune killer cell
- H energy container
- Pungency gene
- etc …



Center for Plant Molecular Genetics and Breeding Research (SRC)

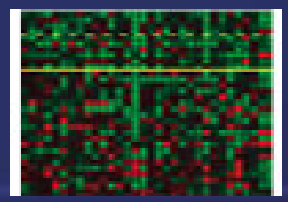
Breeding
Mapping population

Genetic map
Molecular markers

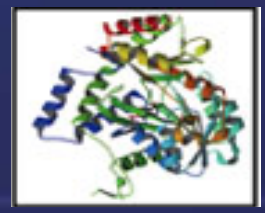
Map based cloning
Candidate gene approach
EST, BAC library

'OMICS'

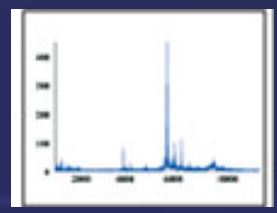
Genomics



Transcriptomics



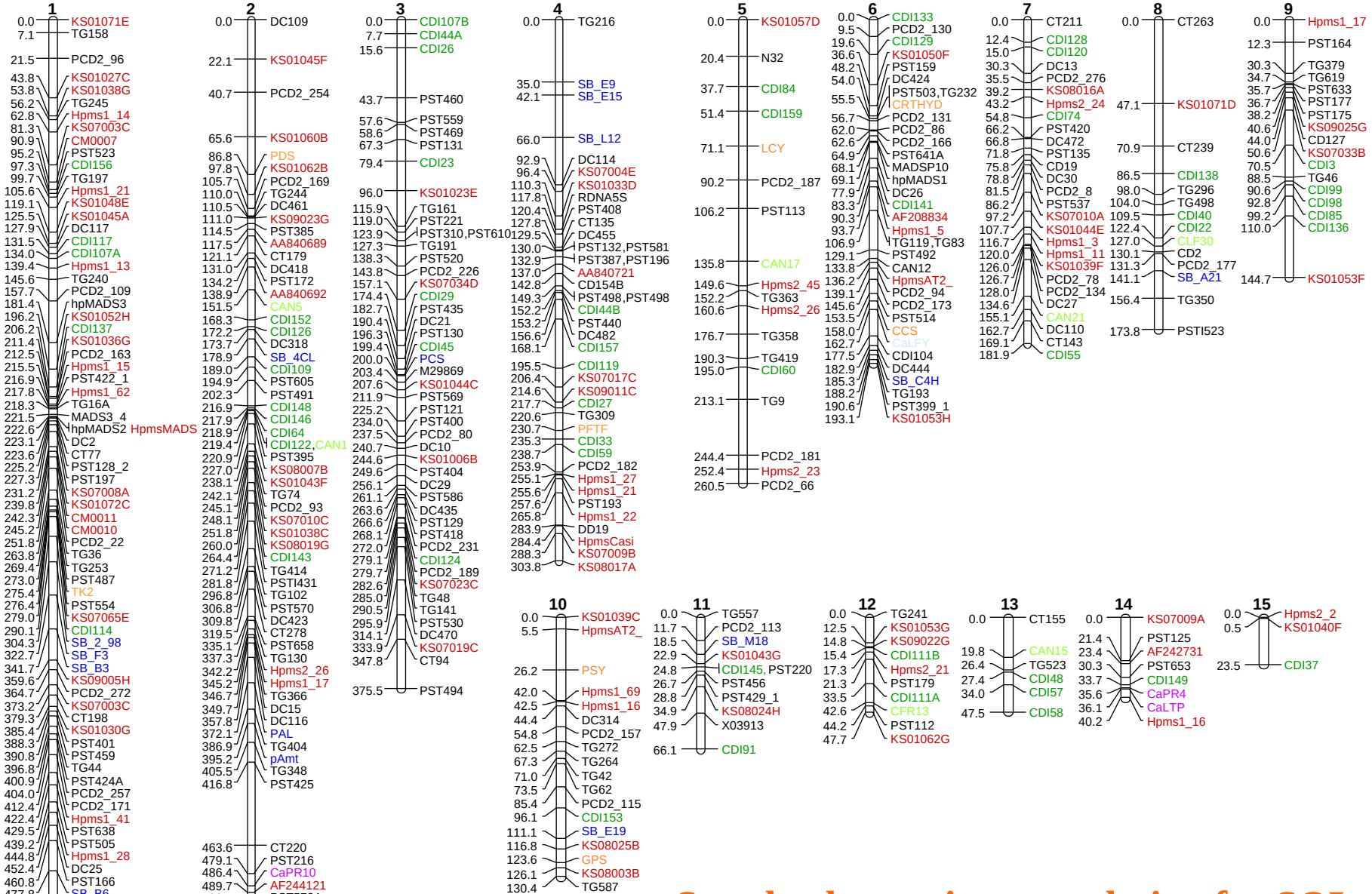
Proteomics



Metabolomics

Breeding by design

Metabolic engineering



Standard mapping population for SOL

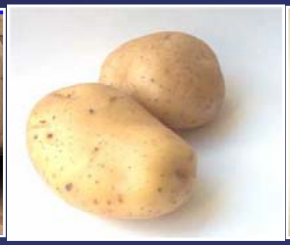
C. annuum TF68 X *C. chinense* Habanero F_2

BAC library 15 x genome size

Solanaceae Genome International Consortium (SOL)

Tomato

Potato



Eggplant

Coffee

Petunia

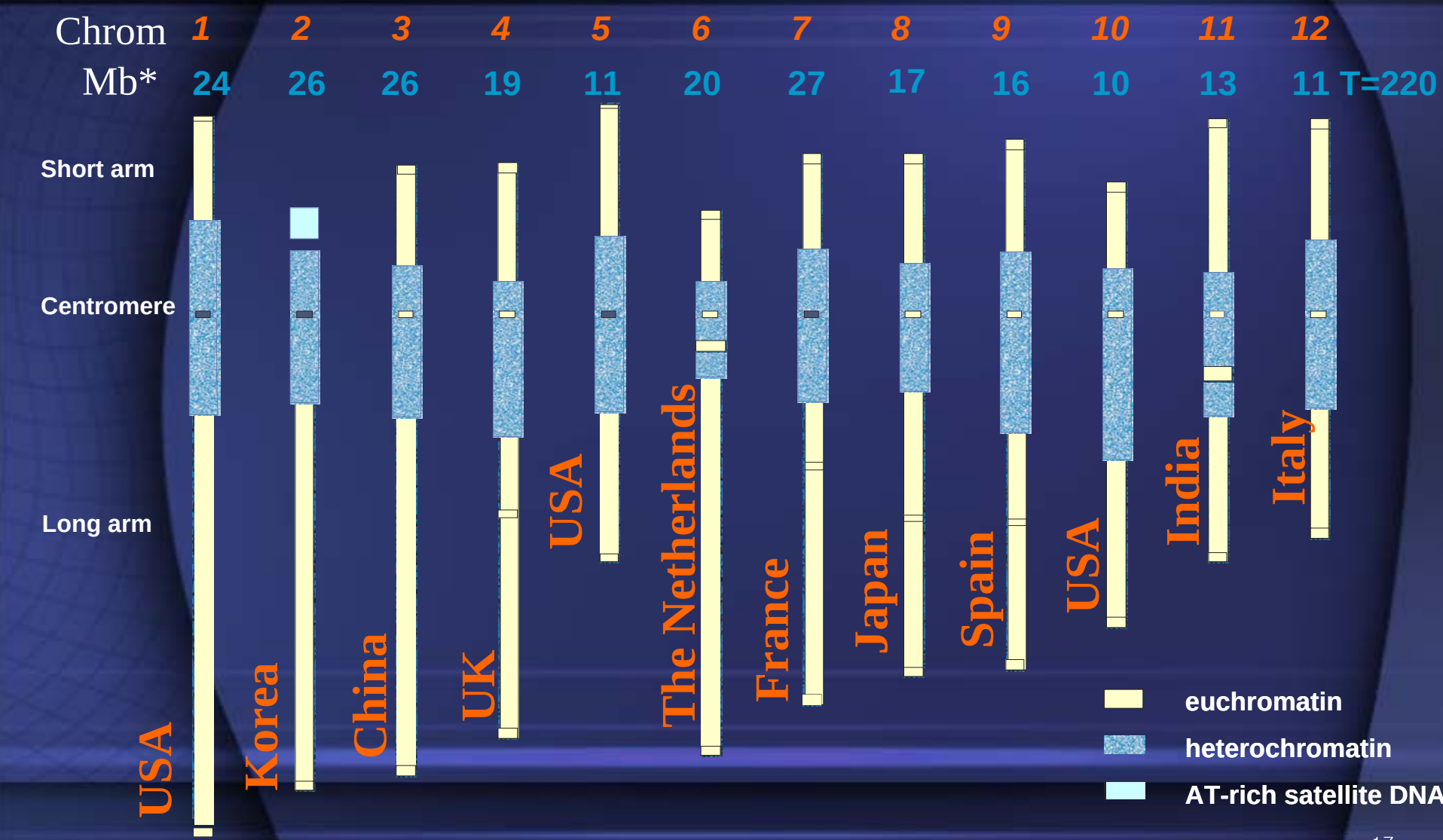
Pepper

Tomato Genome Sequencing Project

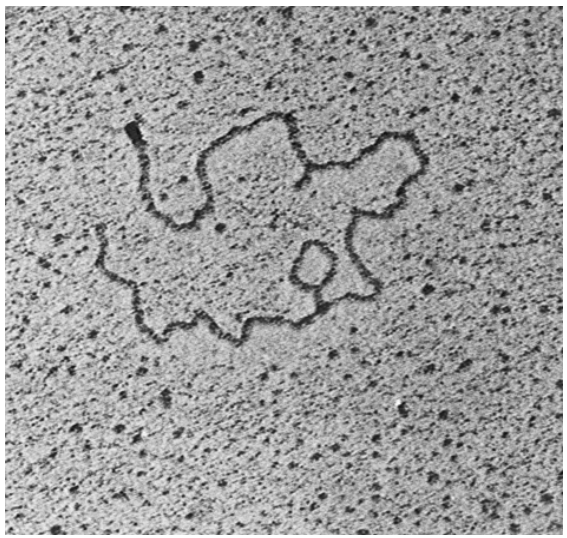
Arabidopsis, Rice and other Genomes

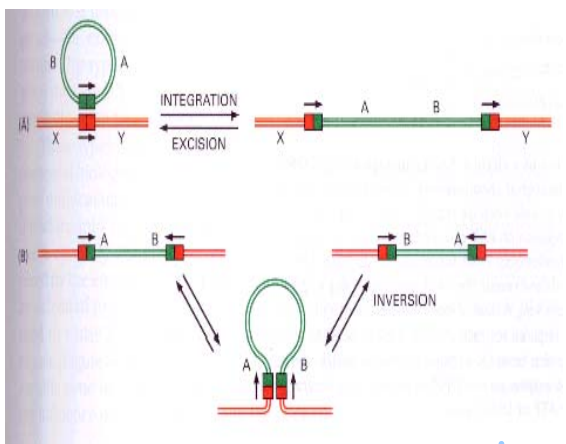
Comparative genomics, Breeding by design

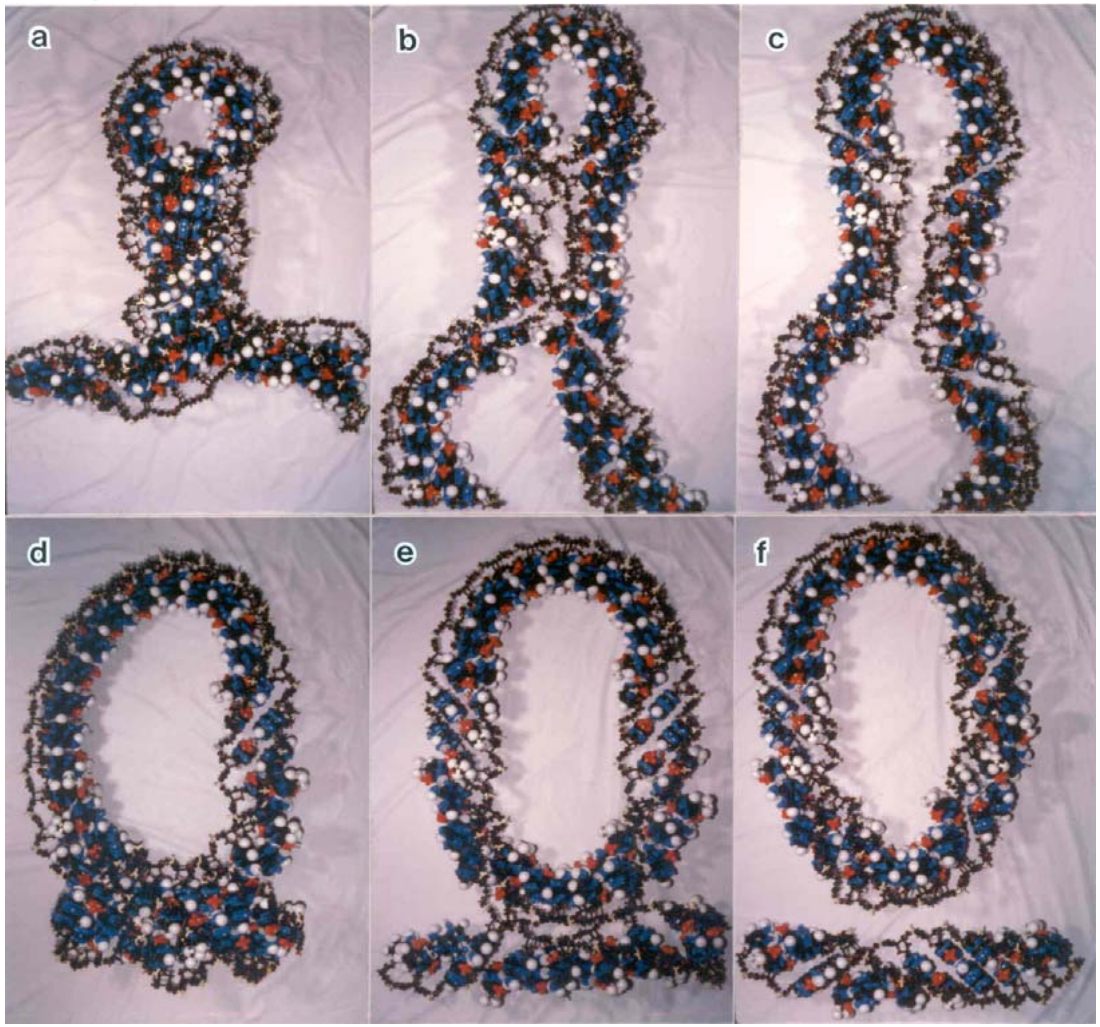
The Tomato Sequencing Expedition



Foldback Intercoil (FBI) DNA for Homologous Recombination







http://plaza.snu.ac.kr/~mglab/en_frame.htm

Summary on S&T Policy in Korea

"Vision 2025"

Long Term S&T Development Policy

1. "Selection and Concentration"
2. Strong investment on S&T research
3. More balanced innovation system

   Encourage cooperation and competition among tripartite partners: Industry, Academia, and Public Research Institutes

Thank you!