

Life Sciences

College of Natural Sciences



이화여자대학교
EWhA WOMANS UNIVERSITY

Unveiling the Mystery of Life

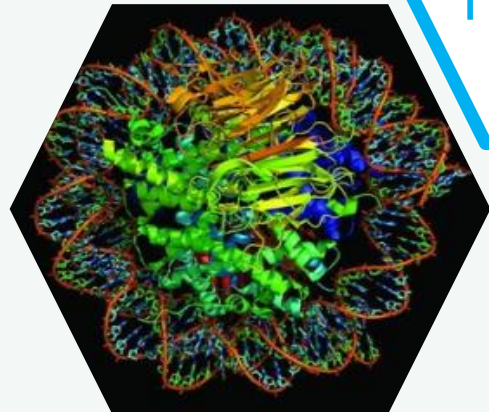
Integrative understanding of Biological Phenomena



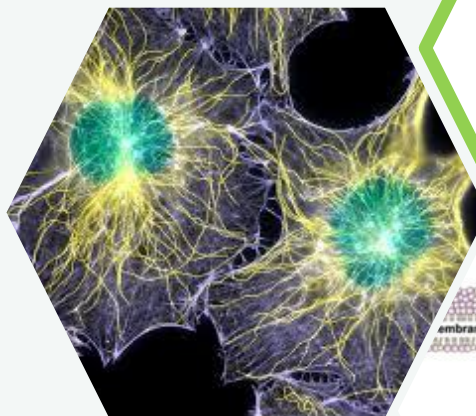
Bio-
molecu
les



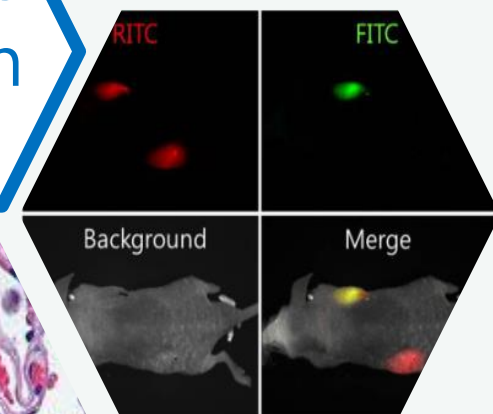
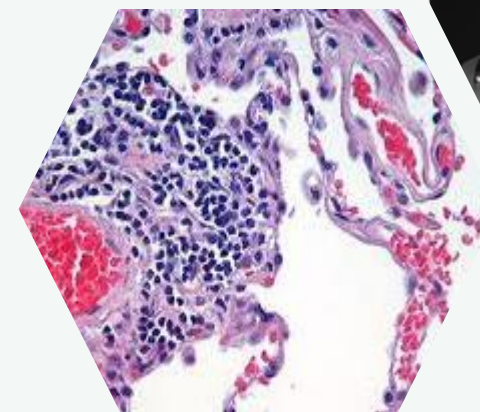
Organi
sm



Cell
signall-
ing



Tissues
/Organ
s



Coming of Age of Life Sciences

Early 20C

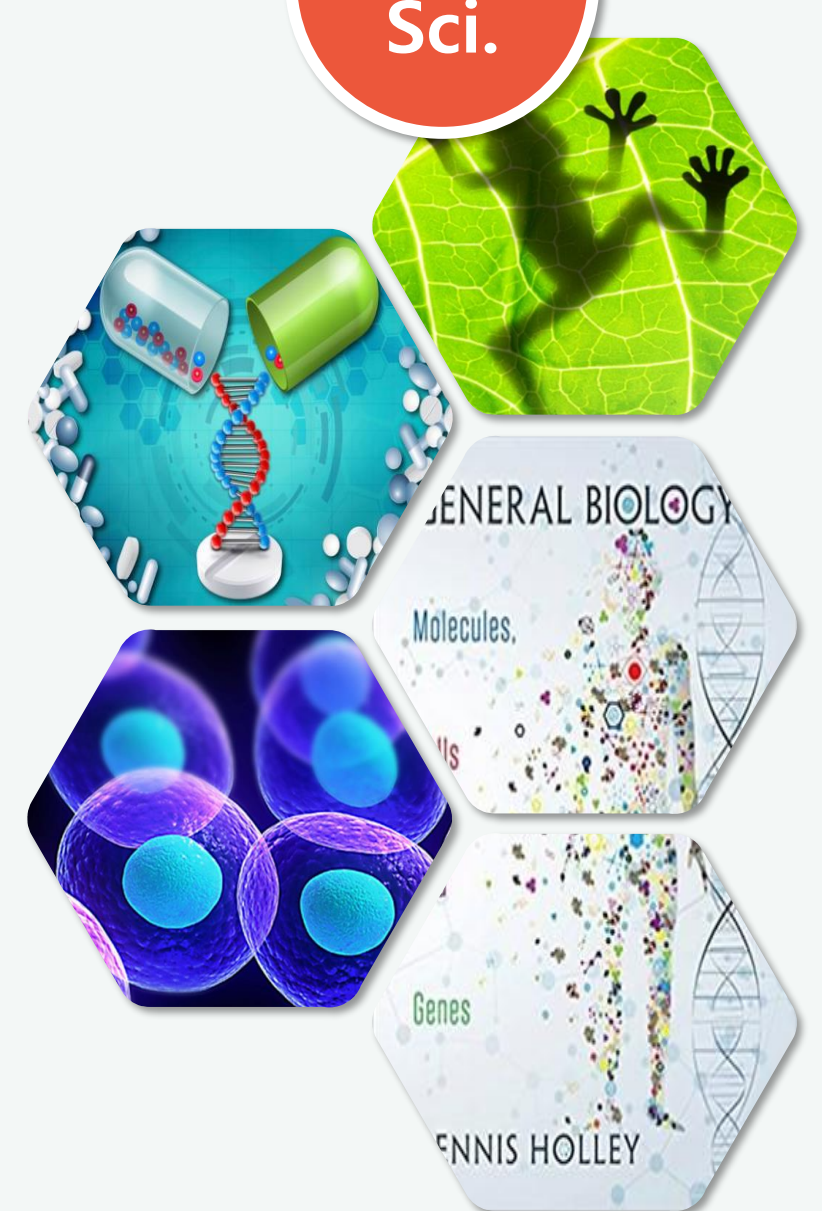
Late 20C

21C

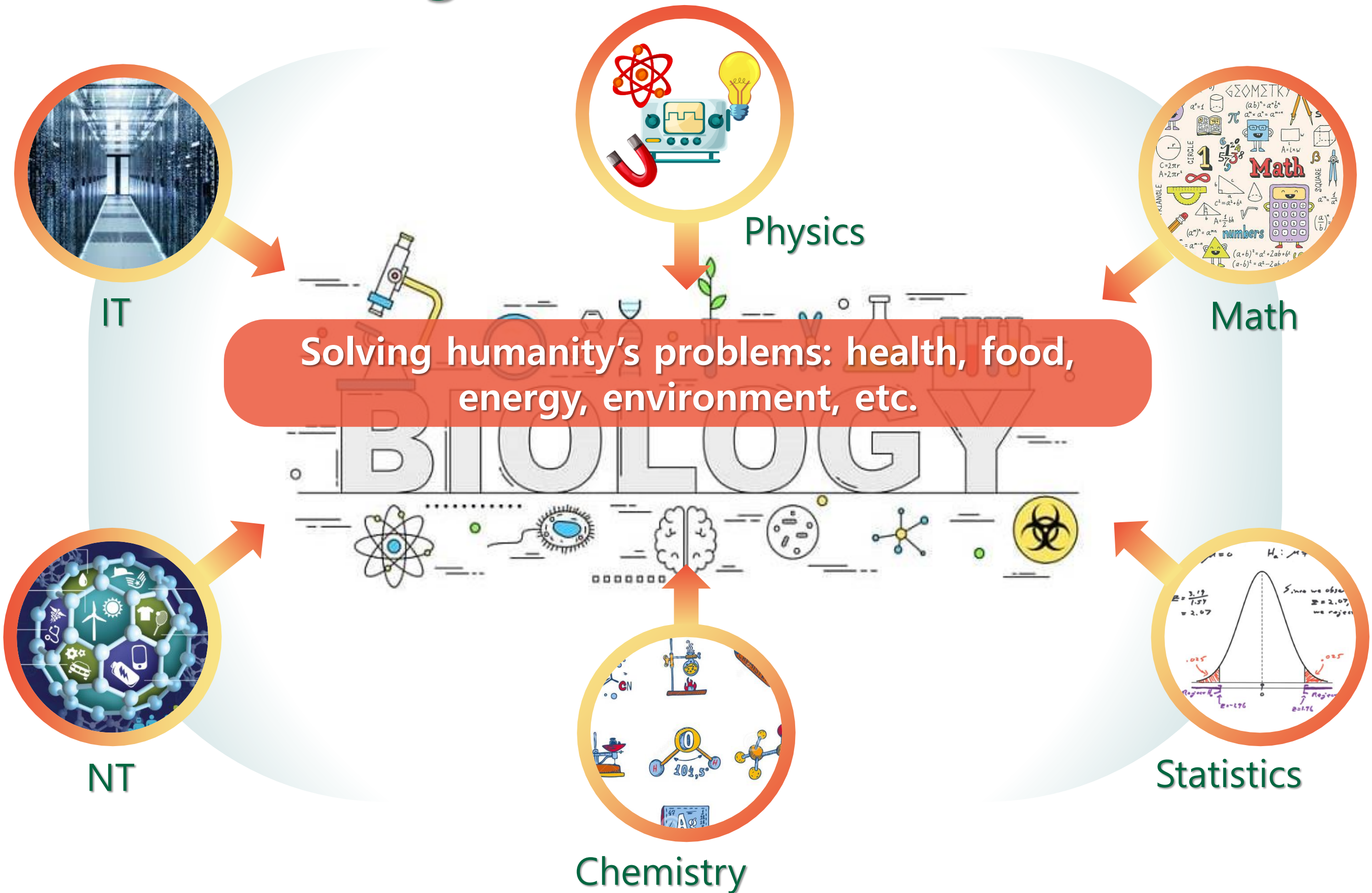
Physics

Chemistry

Life Sci.



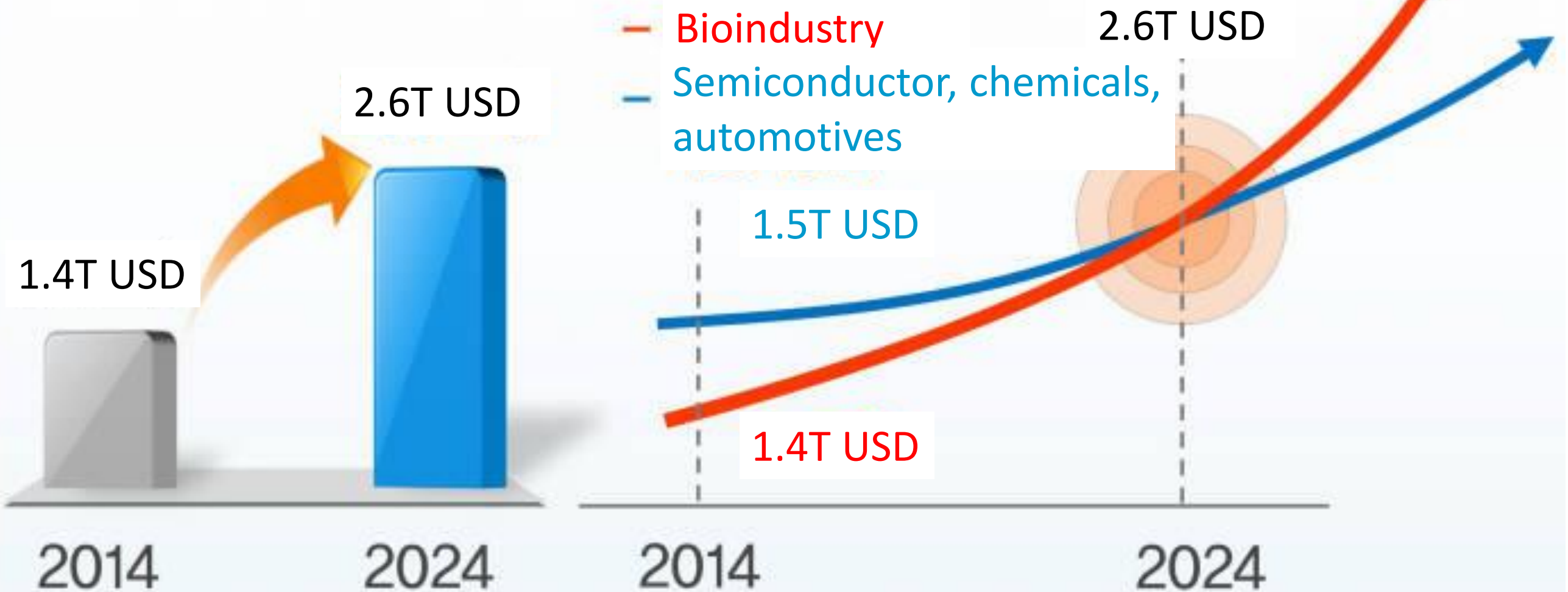
Modern Biology: Integration & Convergence





Global Bioindustry outlook

Global Bioindustry Market





Biopharmaceuticals Outlook

Top 10 KOSPI Market Cap Companies, 2011
vs. 2021 (in Billion KRW)

Rank	2011.02.17	Market Cap	2021.02.17	Market Cap
1	Samsung Elec.	140,524	Samsung Elec.	497,283
2	POSCO	42,547	SK Hynix	93,912
3	Hyundai Motors	39,209	LG Chem*	67,980
4	Hyundai Heavy Ind.	32,680	NAVER	64,391
5	LG Chem	25,382	Samsung Elec. (preferred)	61,717
6	Hyundai Mobis	24,725	Samsung SDI	55,355
7	Shinhan Financial	22,548	Samsung Biologics	51,940
8	Samgung Life Ins.	22,400	Hyundai Motors	51,921
9	Kia Motors	22,095	Kakao	45,044
10	KB Financial	21,868	Celltrion	43,739

From: Korea Exchange (KRX)

Three out of ten largest companies in Korea are biopharmaceutical companies (yellow) in 2021, compared with 2011 when there was none.

* Merged with LG Life Sciences



Advancing Department

**3rd phase
(2011~)**

**2nd phase
(2007~2010)**

**1st phase
(1998~2006)**

New millennium Ewha Development Plan

Specialization in Life Sciences

- Cell signaling research center
- BK21 grant
- Integrative research system

Initiative Ewha

Cultivating world-class talents

- National Core Research Center (NCRC)
- Creative Korea (MoE)
- World Class Univ. (MEST)
- Strengthen integrative research

Global Frontier Ewha

World-Class Research Groups in Life Sciences

- Research Center for Cellular Homeostasis
- Systems Biology Research Center
- Ewha Laboratory Animal Center
- Fluorescence Core Imaging Center
- Eco-Creative BK21
- Faculty-led startups

Faculty Research Areas

- Cell signaling and target discovery
- Cancer, inflammation, aging, and metabolic diseases
- Immunity and antibody engineering
- Development, genetics and animal models
- Systems genomics and personalized medicine
- Eco-creative program





Cell signaling and target discovery



Yun Soo Bae



Sang Won Kang



Dongmin Kang

- ❑ Redox cell signaling; cardiovascular disease research
- ❑ Novel disease target discovery and drug development
- ❑ Cancer research based on molecular imaging of cells

Cancer, Inflammation, Aging, and Metabolic Diseases



- ❑ Disease-related cell signaling mechanisms
- ❑ Omics-based epigenomics research
- ❑ Controlling cancers and inflammatory diseases
- ❑ Aging and neurodegenerative diseases



Eok-Soo Oh



Jongbum
Kwon



Woojin Jeong



In Hye Lee



Taesoo Kim



Mijung Kwon



Dong-Hoon
Hyun



Hyun Seok
Kim

Immunity and Antibody Engineering



Soo Young Lee



Jong Ran Lee

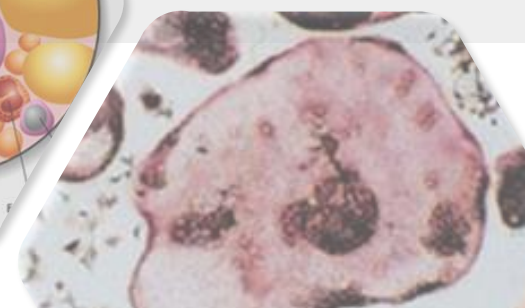
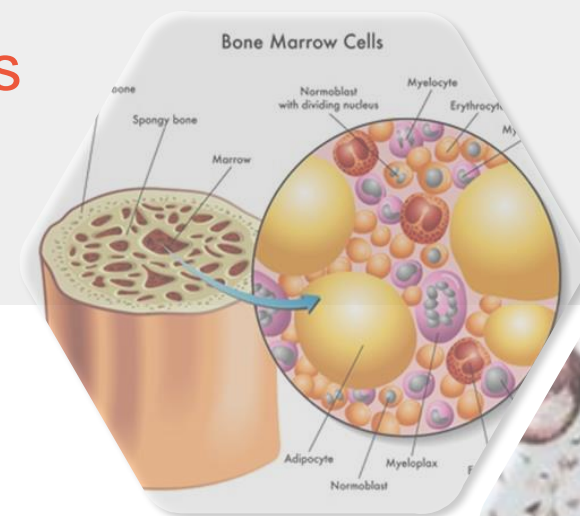


Hyunbo Shim



Seon Ah Lim

- ❑ Osteoclast functions, differentiation, and signal transduction
- ❑ Immune cell signaling and immunological disorders
- ❑ Novel antibody-based biotherapeutics
- ❑ Immunometabolic and immuno-oncology therapy by NK cells and T cells



Development, Genetics, and Animal Models



Goo Taeg Oh



Chang-Yeol
Oh

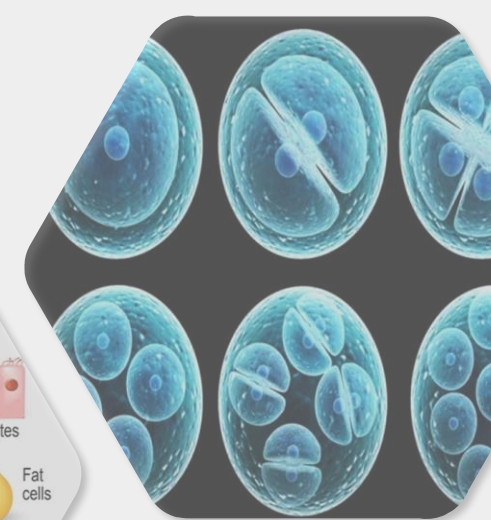
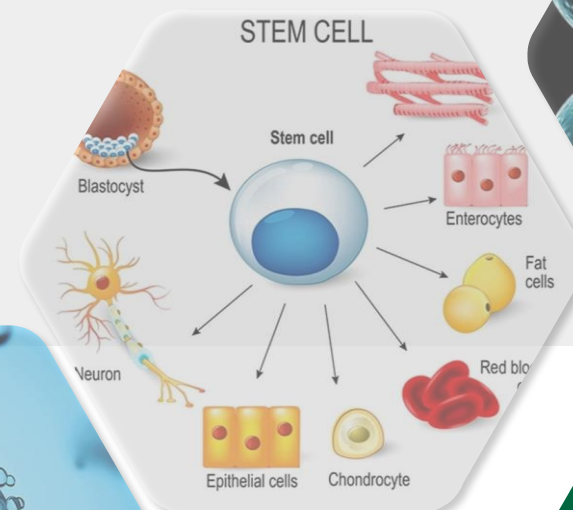


Daekee Lee



Yangkyun Yeo

- ❑ Cardiovascular research using knock-out mice
- ❑ Developmental biology of vertebrates
- ❑ Cancer cell signaling research using knock-out mice
- ❑ Behavioral neurophysiology research using *Drosophila* models



Systems Genomics and Personalized Medicine



Sanghyuk Lee



Jaesang Kim

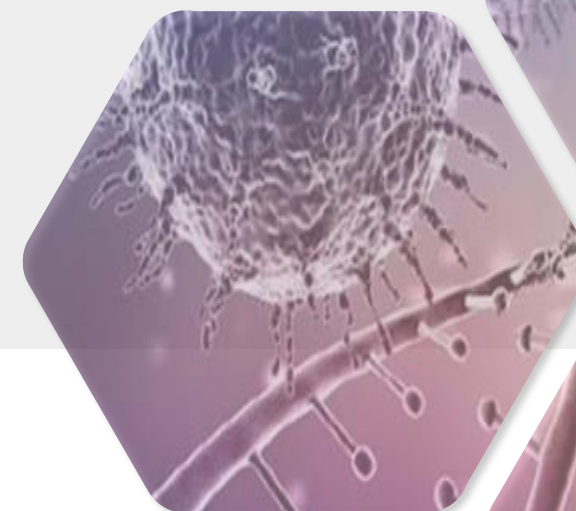


Wan Kyu Kim



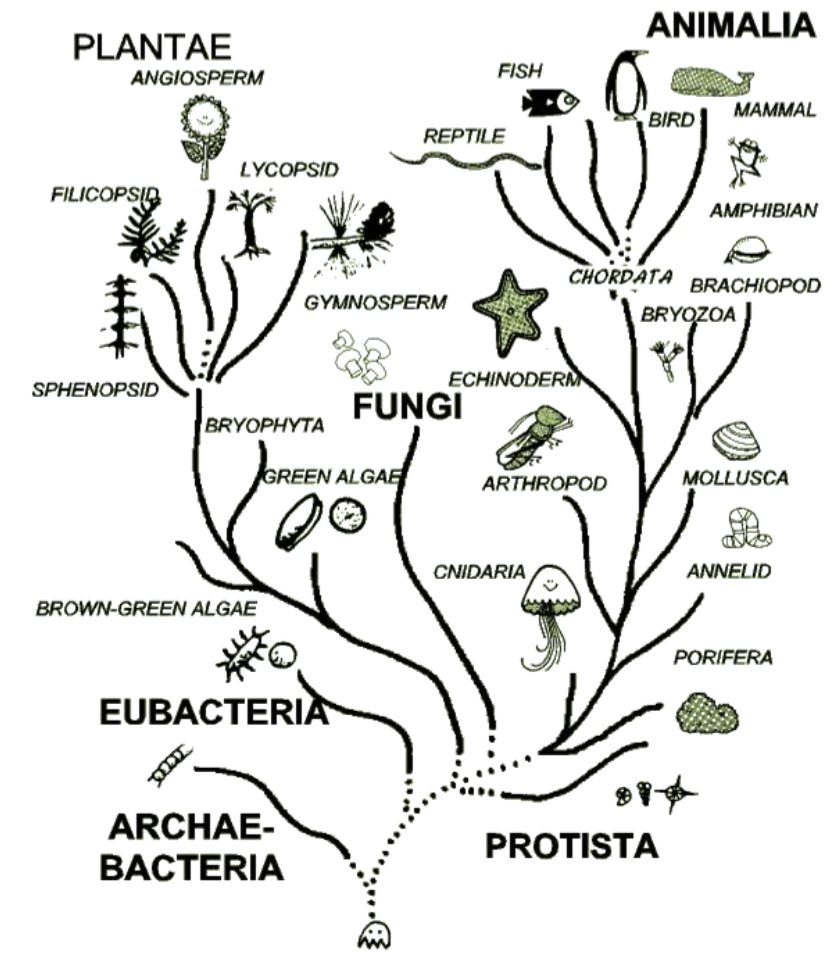
Tae Young Roh

- ❑ Personalized medicine research through cancer genomics and bioinformatics
- ❑ Stem cell differentiation and omics-based neurobiology and cancer biology research
- ❑ Data-driven drug discovery
- ❑ Epigenetics and bioinformatics-based cancer and stem cell research



EcoScience

- ❑ Research on animal behavior and ecology
- ❑ Industrial microbial engineering
- ❑ Speciation, evolution, biodiversity, and symbiosis



Jae Chun Choe



Yi Kwon Jang



Ok Bin Kim



Yong Jin Won



Yuseob Kim



Jung Ki Park



Eunsoo Kim



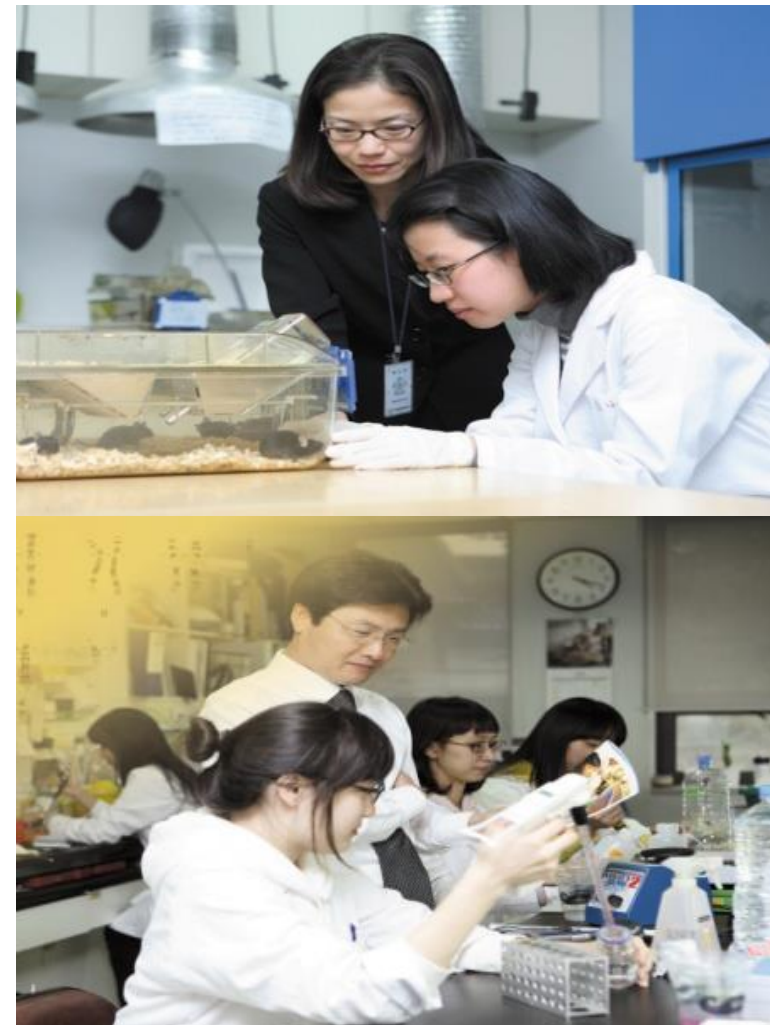


Departmental Programs for Undergraduates



Eo-Wu-Rum Festival

Two-day program for incoming class in the beginning of Spring semester



Lab Rotation and Research Internship

Months-long research projects with professors and graduate students

Bio-Career Day

Held during October

Who to attend:

- Undergrad Life Sciences majors
- Students interested in joining Life Sciences department

Contents:

- Biology-related career choices
- Alumni talks and lectures
- Discussion with professors





Our Alumni are in:



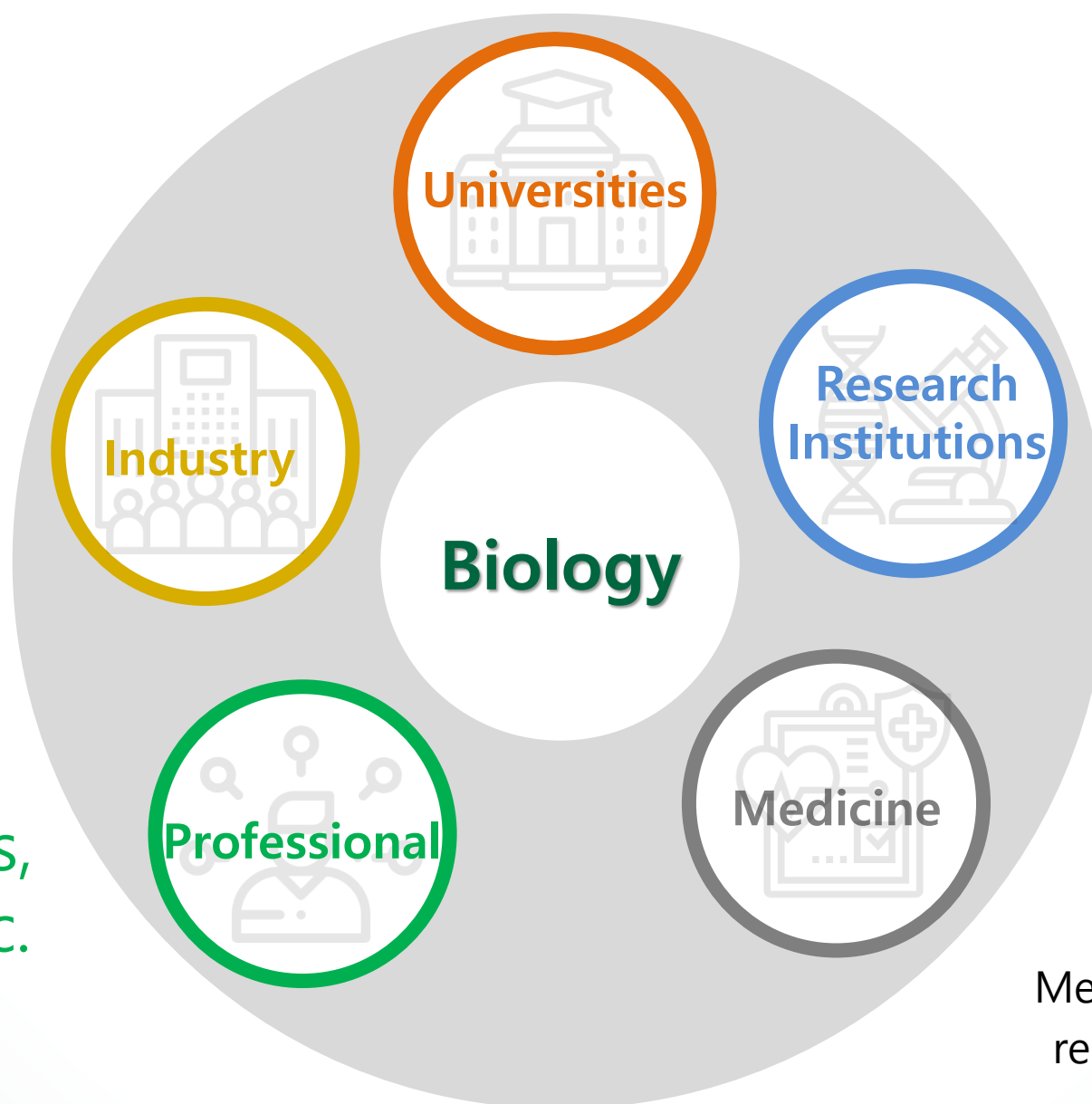
Academics

Ewha, SNU, Korea U, Yonsei U, Kangwon U, Jeju U, Hallym U, Sungshin U, U of Utah, U of Texas, etc.

Pharmaceutical, cosmetic, food, biotechs

Global big pharmas, LG Chem, Yuhan, Dong-A, Green Cross, Amorepacific, CJ, LG H&H, etc.

Lawyers, reporters, entrepreneurs, etc.



Research Institutes

KIST, KNIH, KRIBB, KISTI, KIRAMS, KDCA, KRICT, KIOST, KOPRI, RDA, etc.

Medicine & Pharmacy

Medical & pharmacy schools, also research staffs in major research hospitals



Graduate Program

Full tuition support + stipend

**Department of Life Sciences:
23 Professors / Laboratories**

**Division of Ecoscience:
7 Professors / Laboratories**

**Dept. of Bioinspired Sciences:
2 Professors (adjunct)**

Bioinformatics Graduate Program

Cooperative program:

3 Life Sciences professors +
Statistics, computer sci. depts



Our Excellence and Competitiveness

Research

- Average impact factor per professor (>7)
- Publications in top tier journals including *Cell*
- > 8 billion KRW research grants per year
- Strong core research capabilities

Industry Collaboration

- Five faculty-founded startups
- 18B KRW VC funding (VasThera Inc.)
- >100 patents applied and/or granted
- >30 tech transfers

Dept. of Life Sci.

- >60 papers past 5 years by international collaboration
- >120 presentations in international conferences
- Hosted annual international symposia for past 10 years

Globalization

Education

- Core subjects taught by faculty with expertise in the area
- Specialized programs for female scientists
- High graduate employment rate
- Faculty-student ratio of 3.3



Faculty-Founded Startup Companies

Professor	Company	Core Technology	Funding (KRW)
Sang Won Kang	VasThera Inc.	Developing Therapies for Cardiovascular diseases and Cancers	3.5B government grant 6B Series A funding 18B Series B funding
Yun Soo Bae	Celros Biotech Co., Ltd.	Developing Antibody Drug and Nox Inhibitor	3.5B government grant 2B Series A funding
Wankyu Kim	KAIPharm Inc.	Bioinformatics, Drug-transcriptomics, AI-based drug development	>7B in VC funding and government grants
Goo Taeg Oh	ImVasTech Inc.	Antibody-based diagnostics and therapy of arteriosclerosis	0.3B Korea Technology Finance Corp.
Eok-Soo Oh	SkinQC Inc.	Analytical evaluation of function and harmfulness of natural materials	-



Thank you!