

**Precision medicine for hepatocellular carcinoma
using the multi-omics dataset with predictive genomics:
*Deciphering resectable HCC***

Sung Hwan Lee, M.D., Ph.D.

Assistant Professor

Department of Surgery, CHA Bundang Medical Center

School of Medicine, CHA University

The Cancer Genome Atlas (TCGA) Project

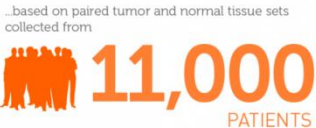
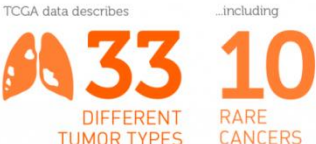


NATIONAL CANCER INSTITUTE THE CANCER GENOME ATLAS

TCGA BY THE NUMBERS



To put this into perspective, **1 petabyte** of data is equal to



TCGA RESULTS & FINDINGS

MOLECULAR BASIS OF CANCER

Improved our understanding of the genomic underpinnings of cancer

For example, a TCGA study found the basal-like subtype of breast cancer to be similar to the serous subtype of ovarian cancer on a molecular level, suggesting that despite arising from different tissues in the body, these subtypes may share a common path of development and respond to similar therapeutic strategies.

TUMOR SUBTYPES

Revolutionized how cancer is classified

TCGA revolutionized how cancer is classified by identifying tumor subtypes with distinct sets of genomic alterations.*

THERAPEUTIC TARGETS

Identified genomic characteristics of tumors that can be targeted with currently available therapies or used to help with drug development

TCGA's identification of targetable genomic alterations in lung squamous cell carcinoma led to NCI's Lung-MAP Trial, which will treat patients based on the specific genomic changes in their tumor.

THE TEAM



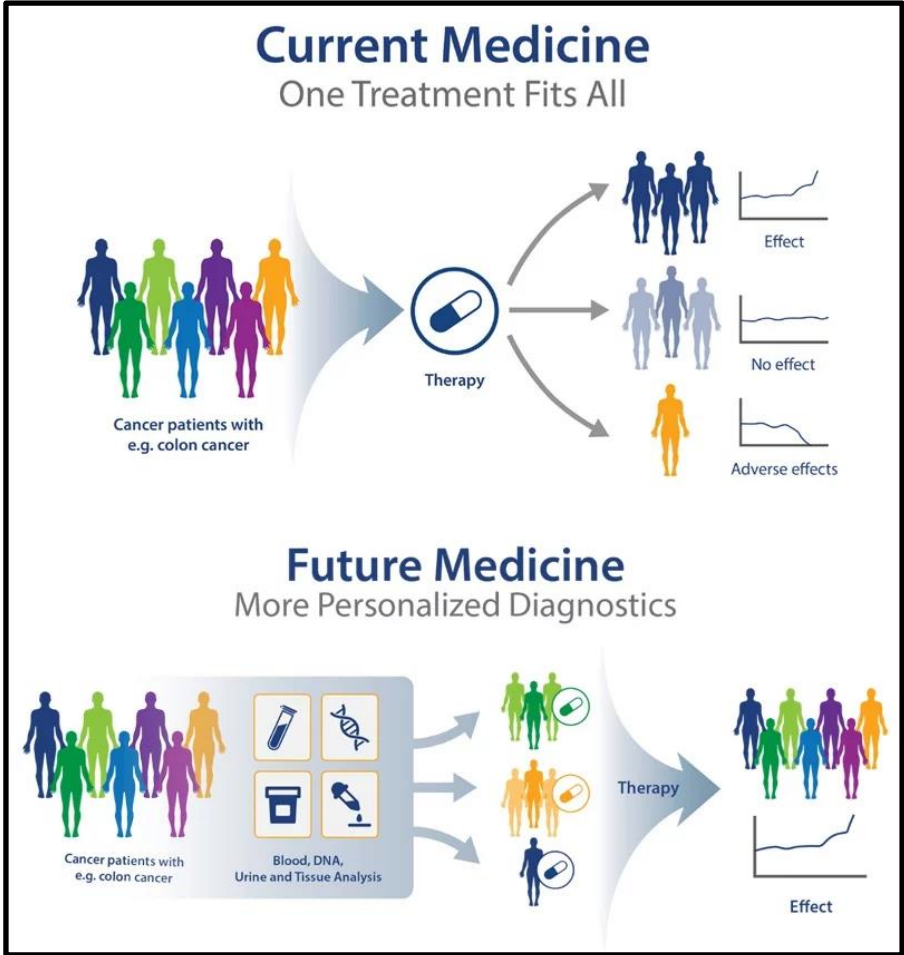
WHAT'S NEXT?

The Genomic Data Commons (GDC) houses TCGA and other NCI-generated data sets for scientists to access from anywhere. The GDC also has many expanded capabilities that will allow researchers to answer more clinically relevant questions with increased ease.



*TCGA's analysis of stomach cancer revealed that it is not a single disease, but a disease composed of four subtypes, including a new subtype characterized by infection with Epstein-Barr virus.

Precision Medicine Initiative





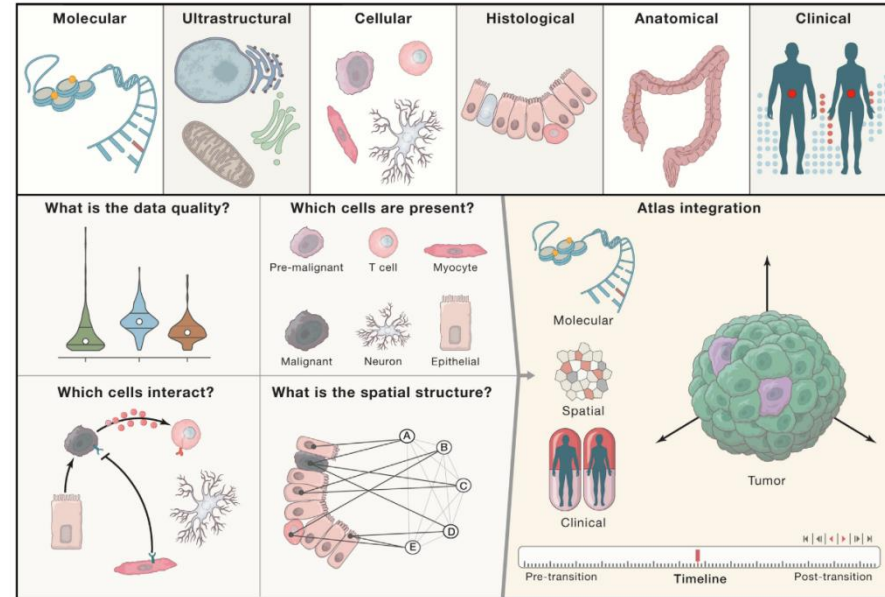
Leading Edge
Perspective

The Human Tumor Atlas Network: Charting Tumor Transitions across Space and Time at Single-Cell Resolution

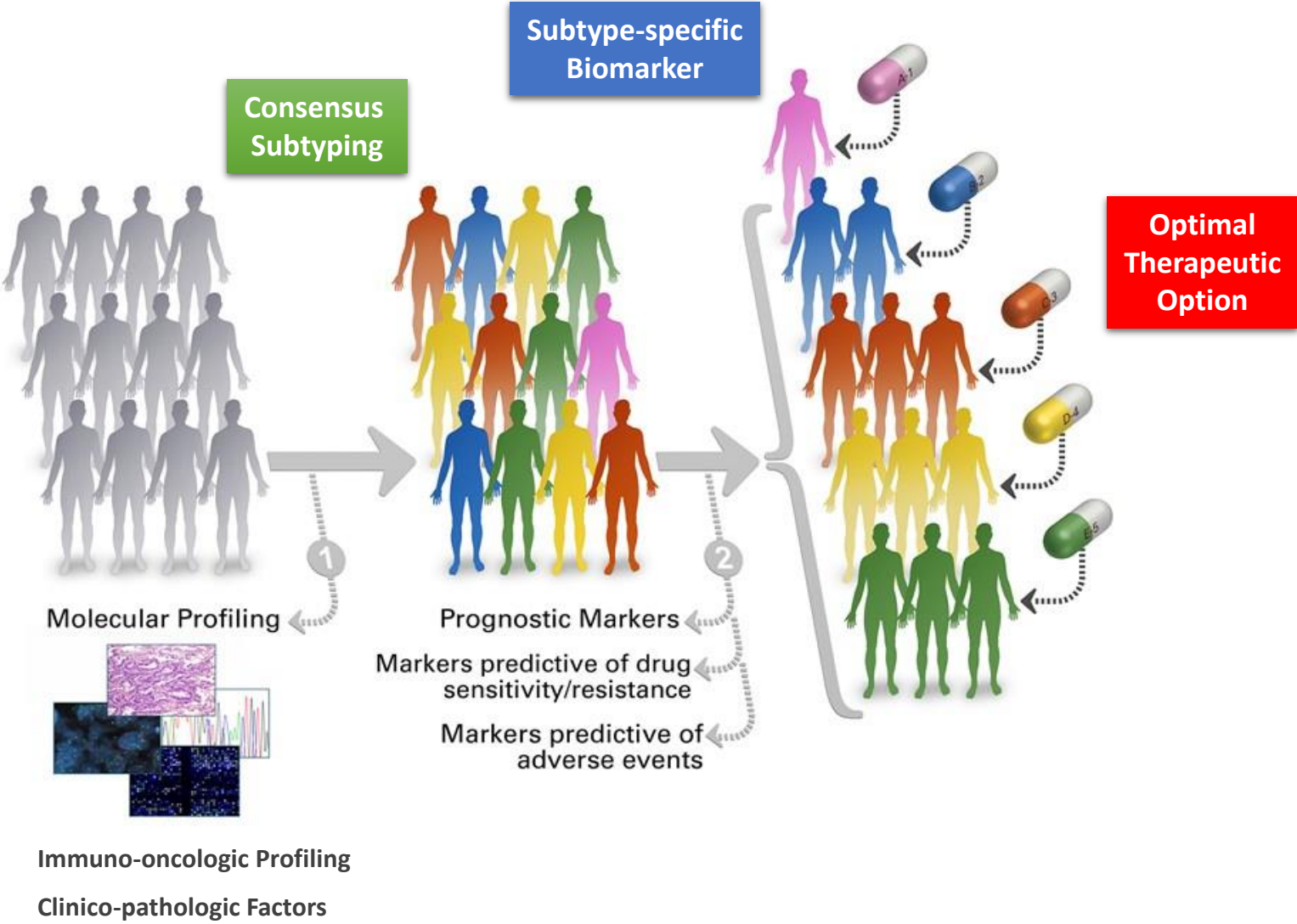
Orit Rozenblatt-Rosen,^{1,35} Aviv Regev,^{1,2,3,35,36,*} Philipp Oberdoerffer,^{4,35} Tal Nawy,^{5,35} Anna Hupalowska,¹ Jennifer E. Rood,¹ Orr Ashenberg,¹ Ethan Cerami,² Robert J. Coffey,² Emek Demir,³ Li Ding,³ Edward D. Esplin,¹⁰ James M. Ford,^{10,11} Jeremy Goecks,¹² Sharmistha Ghosh,¹³ Joe W. Gray,¹⁴ Justin Guinney,^{15,16} Sean E. Hanlon,¹⁷ Shannon K. Hughes,¹⁷ E. Shelley Hwang,^{18,19} Christine A. Iacobuzio-Donahue,²⁰ Judit Jané-Valbuena,¹

(Author list continued on next page)

¹Broad Institute of MIT and Harvard, Cambridge, MA 02142, USA
²Howard Hughes Medical Institute, Chevy Chase, MD 20815, USA
³Koch Institute for Integrative Cancer Research, Department of Biology, MIT, Cambridge, MA 02139, USA
⁴Division of Cancer Biology, National Cancer Institute, NIH, Rockville, MD 20850, USA
⁵Computational and Systems Biology Program, Sloan Kettering Institute, Memorial Sloan Kettering Cancer Center, New York, NY 10065, USA
⁶Department of Data Sciences, Dana-Farber Cancer Institute, Boston, MA 02215, USA
⁷Department of Medicine, Vanderbilt University Medical Center, Nashville, TN 37232, USA
⁸Department of Molecular and Medical Genetics, School of Medicine, Oregon Health & Science University, Portland, OR 97239, USA
⁹Department of Medicine, McDonnell Genome Institute, and Siteman Cancer Center, Washington University in St. Louis, Saint Louis, MO 63108, USA
¹⁰Department of Genetics, Stanford School of Medicine, Stanford, CA 94305, USA
¹¹Department of Medicine, Oncology Division, Stanford University School of Medicine, Stanford, CA 94305, USA
¹²Computational Biology Program, Oregon Health and Science University, OR 97201, USA
¹³Division of Cancer Prevention, National Cancer Institute, NIH, Rockville, MD 20850, USA
¹⁴Center for Spatial Systems Biomedicine, Department of Biomedical Engineering, Oregon Health & Science University, Portland, OR 97201, USA
¹⁵Sage Bionetworks, Seattle, WA 98121, USA

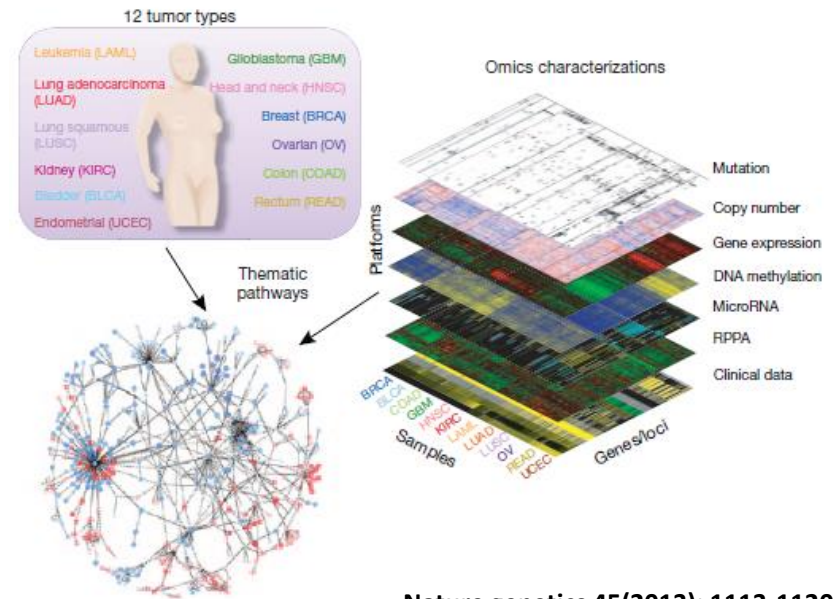
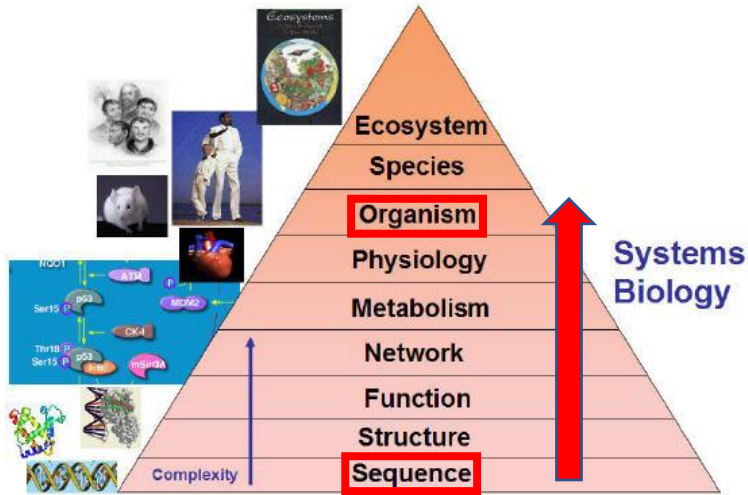


Personalized Cancer Management



중점 연구 분야 – Systems Biology

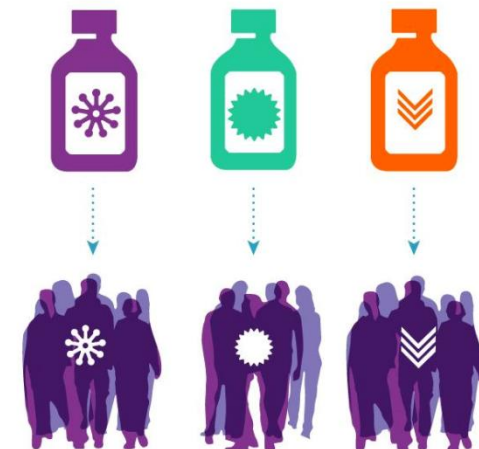
Hierarchical organization in biology



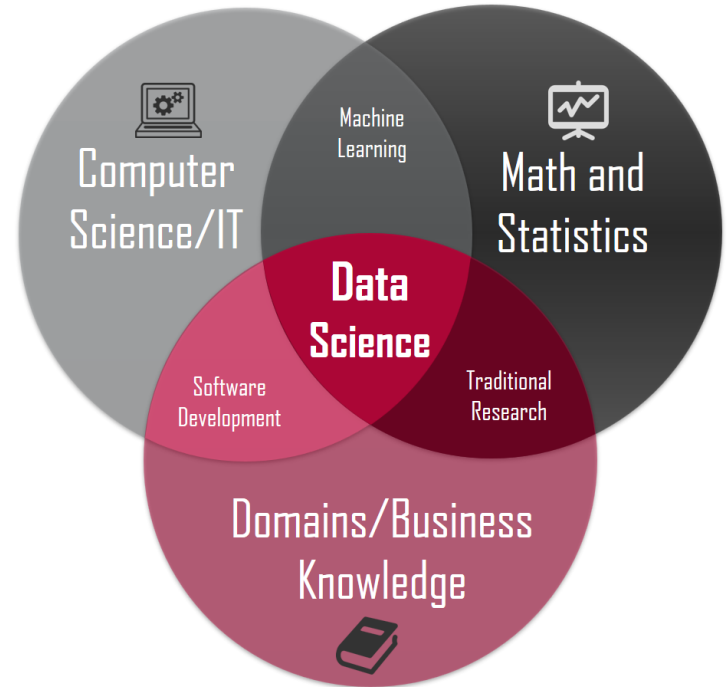
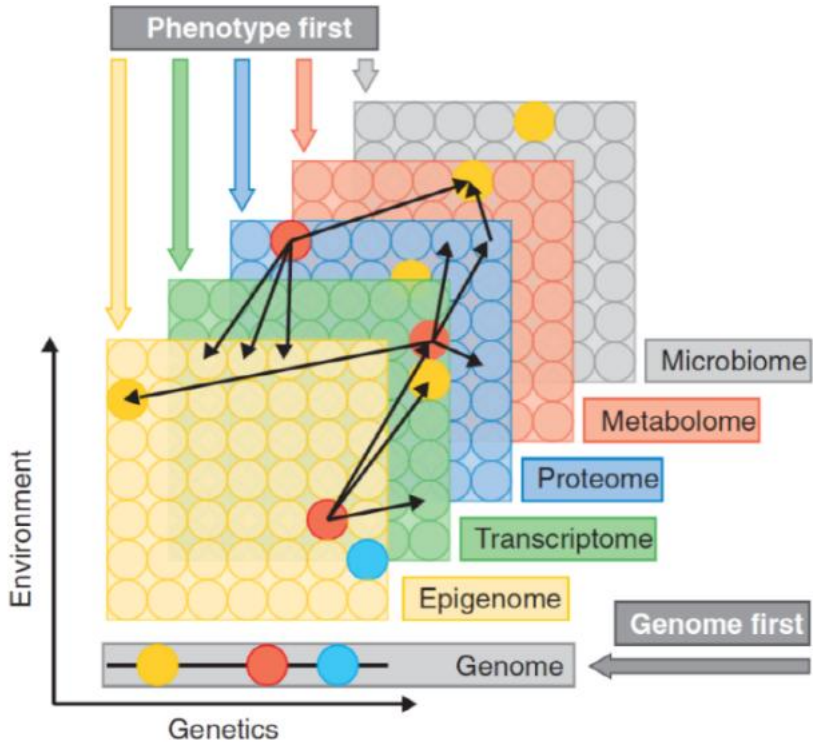
Nature genetics 45(2013): 1113-1120.

UNDERSTANDING PRECISION MEDICINE

In precision medicine, patients with tumors that share the same genetic change receive the drug that targets that change, no matter the type of cancer.



중점 연구 분야 – Data Science



Thanks for your kind attention!