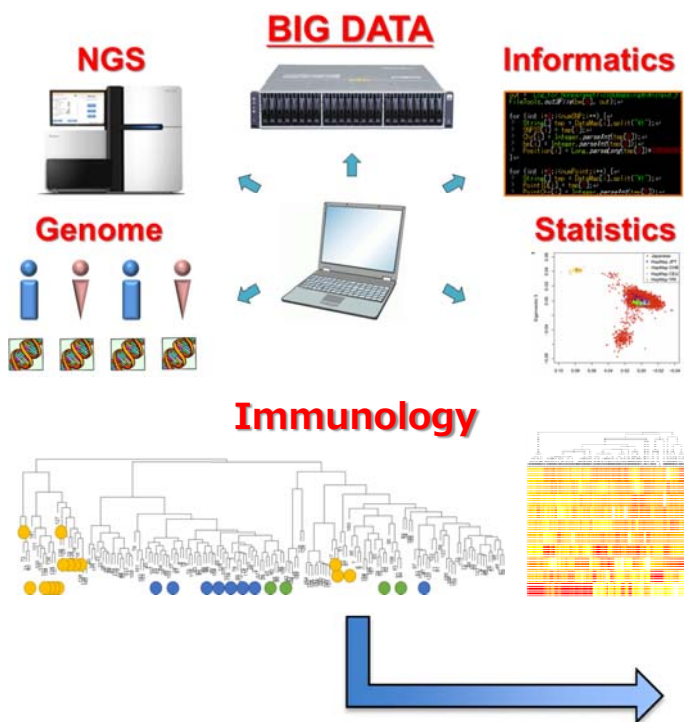


# Laboratory of Statistical Immunology

## Statistics + Genetics + Immunology



PI: Yukinori Okada

## Personalized medicine using genome data

### Class I HLA gene

HLA-A  
HLA-B  
HLA-C

### Class II HLA gene

HLA-DRB1  
HLA-DQA1  
HLA-DQB1  
HLA-DPA1  
HLA-DPB1

### Non-classical HLA

HLA-DOA  
HLA-DOB  
HLA-DM

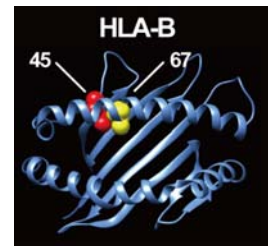
### HLA-like gene

MICA, MICB, TAP

### Pseudo-HLA gene

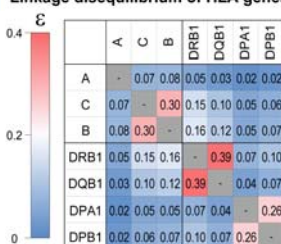
HLA-F/G/H/K/Y  
HLA-DRB2/3/5/8  
HLA-DPA2

Long PCR  
+  
Target Capture  
+  
Long Read NGS

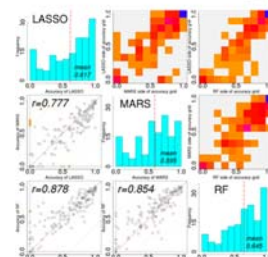
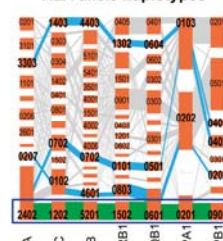


## Biomarker screening by machine-learning

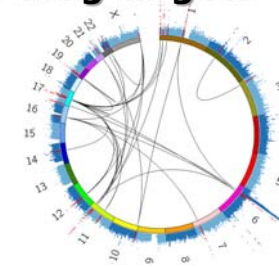
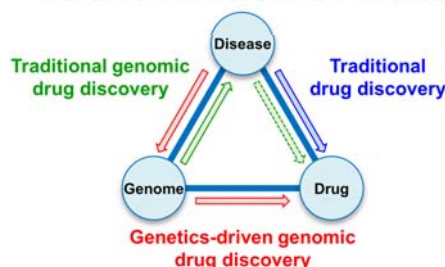
### Linkage disequilibrium of HLA genes



### HLA allele haplotypes



## Identification of novel drug targets



Q: What is statistical genetics and statistical immunology?

A: Statistical genetics is a research field that evaluates causality of human genetic variations on diseases, using statistical and bioinformatics approaches. Statistical immunology especially focuses on genetic and epigenetic data obtained from immunology.

Q: What kind of data do you handle?

A: We handle genome and epigenome data mostly obtained from **human populations** (not from mice... sorry!!). We usually use the large-scale genome-wide association study (GWAS) data generated by SNP microarrays, and whole-genome sequence (WGS) data generated by NGS.

Q: What is the goal of research?

A: Our goal is elucidation of disease biology, disease epidemiology, and novel drug discovery. On this aim, we integrate large-scale human genome data with diverse biological and immunological resources.

Q: What kind of skill is necessary to join Lab. of statistical immunology?

A: Basic computational skills (e.g. Linux OS and programming) are required.