Genome Project in Asia Pacific and use of AP broadband network

Hiroshi Mizushima Ph.D.,
hiroshi@mizushima.info

National Cancer Center Research Institute,
Center for Medical Genomics
Professor, Clinical Genome Informatics Center, Kobe University
Assistant Professor, Tokyo Medical and Dental University
Associate Professor, University of Hawaii, School of Medicine
Vice President, Japan Medical Information Network Association (JAMINA)
Many others…. 
Mortality trends for Causes of Death in Japan

Annual mortality trends for leading causes of death in Japan (1930~2000)
Death rate by Cancer site
5 year survival rate by site
International Comparison of Cancer Site.
Medical Genomics Project by Ministry of Health and Welfare

- As one of the Millennium Genome Projects, Ministry of Health and Welfare launched Medical Genomics Project for Personalized medicine.
- SNP and Microarray (DNA Chip) analysis of Cancer, Hypertension, Diabetes, Asthma, and Alzheimer Diseases.
- SNP related to drug response will also be analyzed.

- Participating National Centers
  - National Cancer Center,
  - National Cardiovascular Center,
  - National Center of Neurology and Psychiatry,
  - International Medical Center in Japan,
  - National Children’s Hospital,
  - National Institute of Health Sciences.
Gene-Environment Interactions

- Japanese immigrant in Hawaii
  - 214,000 people moved from 1885 to 1924
  - Came from Hiroshima, Fukuoka, Yamaguchi and Okinawa

- They are good to see the difference of genetic and environmental effect.

Data from Prof. L. Le Marchand,
Cancer Research Center of Hawaii, Univ. Hawaii.
Age adjusted Incidence Rates for Japanese Migrants to Hawaii 1973-1977

- Fukuoka Japan
- 1st Generation
- 2nd Generation
- Hawaii Caucasian

- Stomach (male)
- Breast
- Colon (male) (female)
# Odds Ratio for Colorectal Cancer by Red Meat Preference, Smoking, NAT2 Genotype and CYP1A2 Phenotype

<table>
<thead>
<tr>
<th></th>
<th>CYP1A2 Phenotype Slow</th>
<th>CYP1A2 Phenotype Rapid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likes well done meat</td>
<td>Likes well done meat</td>
</tr>
<tr>
<td><strong>Non-Smoker</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAT2 Slow</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>NAT2 Rapid</td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Smoker</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAT2 Slow</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>NAT2 Rapid</td>
<td>0.9</td>
<td>8.9</td>
</tr>
</tbody>
</table>
Use of genomic information

Research

• Academic research understanding human
• Relation between gene and disease
• Personalized medicine for drug response and treatment

Practical

→ Having healthy life with best nutrition
University of Hawai'i’s New medical campus
Hawaii Genome Project

- Hawaii Univ. is starting up new Genome and Proteomics Research Center.
- Using ethnic diversity we can perform new genome projects to analyze diseases.

- In this project, comparison with origin county will be important, and network will take important part for collaboration.
Needs of Broadband and Secure Network.

• Genome data is HUGE.
• New kind of HUGE database and bio-measurements coming up.
• Data-GRID / Computational GRID for high level association study analysis.

• Includes personal genome information, which is very sensitive private information.
History of Networking in NCC

• Starts in 1994
• Telemedicine between Cancer Centers in Japan
• International Telemedicine
  – (GIBN, APII, APAN, …. G-H-APAN-JAMINA)
• Information G7 Medical Image Database Project
• Genome research collaboration
Broadband network between Tokyo and Honolulu

Current status

156Mbps

Hawaii

USA (Main Land)

Europe

Australia

Main Land

Philippines

Vietnam

Thailand

Singapore

China

Korea

Japan

India

Sri Lanka

APAN

Aug. 25, 2005
(c) H. Mizushima 2005, All rights reserved.
My hobby

Biking around the world and writing map with GPS

1500km / month

Total 69,070 km

As of 2005/8/25
Biking around the world making maps with GPS.
(Asia Pacific)

Beijing

Hawaii

Taipei

Moscow

Brisbane

Human Network by foot

Aug. 25, 2005
Thank you ....

Related URLs

National Cancer Center
http://www.ncc.go.jp/

Tokyo Medical and Dental University
http://bioinfo.tmd.ac.jp/

University of Hawaii
http://www.hawaii.edu/

Hiroshi Mizushima
http://hiroshi.mizushima.info/

Yoshida T. et.al. National Cancer Center
Tanaka H. Tokyo Medical Dental university
Nagata H. KDDI research Institute
Marchand L. University of Hawaii Cancer Center

Special Thanks to....