



华大基因
BGI

Trans-omics for a better life



What BGI Does

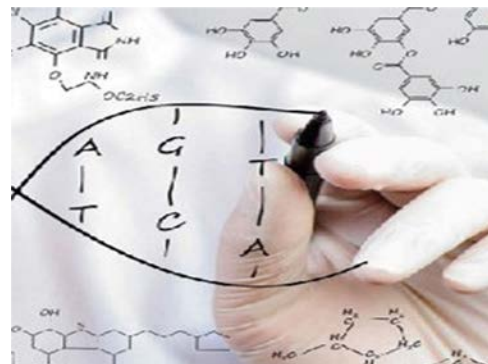


存
Store

读
Read

写
Write

用
Apply



China National GeneBank



Biorepository

湿库 (生物资源样本库)

Bio-informatics data center

干库 (生物信息数据库)

Living Biobank

活库 (生物活体库)



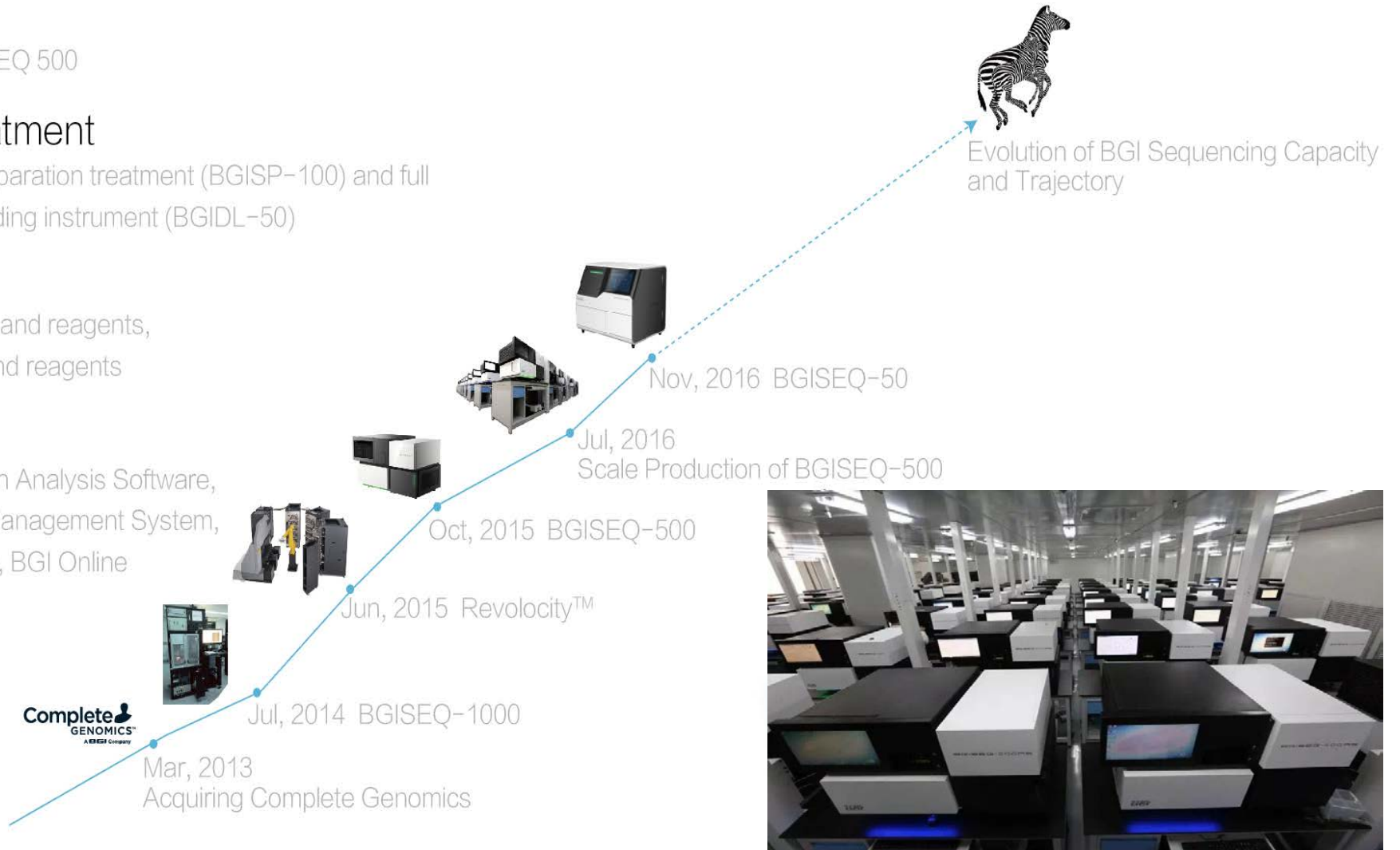
永存、永生
Preserve for the future

存

Store

Sequencing- MGI

- Sequencers
BGISEQ 50 and BGISEQ 500
- Sample pretreatment
automated sample preparation treatment (BGISP-100) and full automated sample loading instrument (BGIDL-50)
- Consumables
library preparation kits and reagents, and sequencing kits and reagents
- Software
Sequencing Application Analysis Software, Sequencing Sample Management System, Sequencing Database, BGI Online



The sequencing platform in CNGB

读

Read

Powerful New Next Generation Sequencing Platforms



BGISEQ-50



MGISEQ-200



BGISEQ-500
CE
CFDA Approved
TFDA Approved



MGISEQ-2000



华大基因
BGI

MGI
华大智造



illumina®
ThermoFisher
SCIENTIFIC

Complete
GENOMICS™
A BGI Company

Currently, only **three companies in two countries** worldwide have the capability to mass-produce clinical sequencers.

写

Write

Building capacity and capability

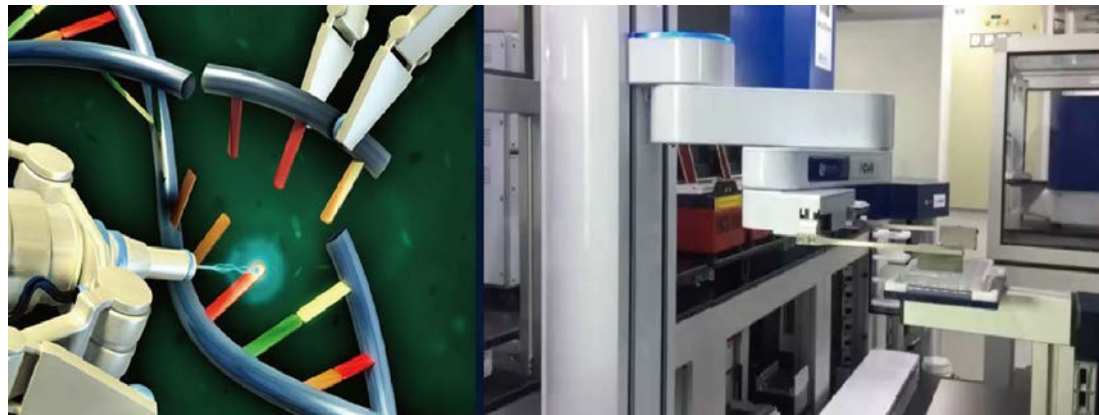
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Synthesis

In March, 2017, the periodical achievements of Sc.2.0 Project were published, which is a major milestone in the filed of synthesis.

Top Ten Science and Technology Advances of 2017 in China



Gene Editing



Launch of the **George Church Institute of Regeneration**

focusing on the development of enabling technologies in high-density DNA storage, biomanufacture of natural products and genome editing for medicine and new therapy

用
Apply

Organizations



Research Capability



GigaScience SCI影响因子位列综合性期刊全球第六 GigaScience Ranks 6th in Category of Multidisciplinary Sciences

(资料来源: 汤森路透社发布2016期刊引证报告 (JCR))

Journal 期刊	Impact Factor 影响因子
1 Nature 《自然》	38.138
2 Science 《科学》	34.661
3 Nature Communications 《自然通讯》	11.329
4 PNAS 《美国国家科学院院刊》	9.423
5 National Science Review 《国家科学评论》	8.000
6 GigaScience	7.463
7 Scientific Reports 《科学报告》	5.228
8 Annals of the New York Academy of Sciences 《纽约科学院年报》	4.518
9 Journal of the Royal Society Interface 《英国皇家学会会报》	3.818
10 Complexity	3.514
11 PLoS One 《公共科学图书馆期刊》	3.057

华大基因名列2012至2016年全球高质量科研产出排名中第12位

(资料来源: 2017年自然指数 www.natureindex.com)

Institution	WFC 2012-2016	AC 2012-2016	Average collaboration share
1 IBM Corporation	266.53	576	51.8%
2 F.Hoffmann-La Roche AG	222.27	485	52.9%
Genentech, Inc.	178.70	305	54.1%
3 Novartis International AG	173.46	533	49.3%
4 Samsung Group	133.79	357	44.2%
5 Pfizer Inc.	110.48	274	50.8%
6 Merck & Co., Inc.	108.89	247	46.8%
7 Nippon Telegraph and telephone Corporation (NTT)	101.09	178	47.0%
8 GlaxoSmithKline plc. (GSK)	100.04	338	52.4%
9 AstraZeneca plc	91.14	329	40.4%
MedImmune, LLC	19.05	47	51.2%
10 Amgen Inc.	75.32	195	63.0%
deCODE Genetics	16.52	98	67.6%
11 Toyota Group	63.02	120	60.5%
Toyota Central R&D Labs., Inc.	40.39	71	62.9%
Toyota Motor Corporation	17.45	41	57.6%
12 BGI	59.85	245	70.3%

2015中国《自然》和《科学》发表指数 Top 25 Chinese Institutions in Nature and Science

(资料来源: Nature Index China tables)

Institution
1 Peking University (PKU) (北京大学)
2 Tsinghua University (TH) (清华大学)
3 BGI (华大基因)
4 Shanghai institutes for Biological Sciences (SIBS), CAS (中科院上海生命科学研究院)
5 Institute of Biophysics (IBP), CAS (中科院生物物理研究所)
6 Zhejiang University (ZJU) (浙江大学)
7 National Institute of Biological Sciences, Beijing (NIBS) (北京生命科学研究院)
8 Dalian Institute of Chemical Physics (DICP), CAS (中科院大连化学物理研究所)
9 University of Chinese Academy of Sciences (UCAS) (中国科学院大学)
10 Ocean University of China (OUC) (中国海洋大学)

华大基因名列2016年中国产业机构第1位

(资料来源: 2017年自然指数 www.natureindex.com)

Institution	AC	FC	WFC
1 BGI	28	5.21	5.21
2 China Shipbuilding Industry Corporation (CSIC)	62	4.23	4.23
3 FiberHome Technologies Group	34	3.97	3.97
4 China National Petroleum Corporation (CNPC)	12	2.83	2.83
5 Chengdu Institute of Organic Chemistry (CIOC), CAS	8	1.92	1.92
6 Shanghai Jiahua Poly Battery Technology Co., Ltd.	5	1.89	1.89
7 Southwestern Institute of Physics (SWIP)	2	1.51	1.51
8 Jinchuan Group Co., Ltd.	9	1.45	1.45
9 Zhejiang NHU Company Ltd.	3	1.36	1.36
10 Sinopec Corporation	8	1.32	1.32

华大基因名列2016年全球生命科学产业机构第8位

(资料来源: 2017年自然指数 www.natureindex.com)

Institution	AC	FC	WFC
1 F. Hoffmann-La Roche AG	58	23.67	23.67
2 Novartis International AG	55	18.86	18.86
3 Amgen Inc.	33	11.54	11.54
4 AstraZeneca plc	40	10.42	10.42
5 Pfizer Inc.	24	9.29	9.29
6 GlaxoSmithKline plc. (GSK)	40	6.59	6.59
7 Leidos Holdings, Inc.	56	4.73	4.73
8 BGI	32	4.63	4.63
...

华大基因名列2012至2016年全球产业-学术合作量企业排名第1位

(资料来源: 2017年自然指数 www.natureindex.com)

Institution	Country/Region	# bilateral collaborations 2012-2016
1 BGI	China	642
2 Amgen Inc.	United States of America (USA)	513
3 GlaxoSmithKline plc. (GSK)	United Kingdom (UK)	494
4 Leidos Holdings, Inc.	United States of America (USA)	486
5 F.Hoffmann-La Roche AG	Switzerland	467
6 Illumina, Inc.	United States of America (USA)	412
7 Novartis International AG	Switzerland	399
8 EurekaScientific, Inc.	United States of America (USA)	381
8 IBM Corporation	United States of America (USA)	381

Clinical Samples Processed

NIFTY 2.84M	HPV 2.68M	Newborn Screening 0.55M	Hearing Impairment 1.62M
Thalassemia 40K+	PGD/PGS 6K+	Monogenic Disorder 24K+	Chromosome Abnormality 12K+

>7,772,000 samples till Feb 2018

The control and prevention of infectious diseases



2003, the first sequencing and developing diagnostic kits on SARS virus in China



2010, the first sequencing and diagnostic of highly pathogenic avian influenza in China



2011, the first sequencing the Germany *E. coli* O104:H4 outbreak in the world



2014, the detection and sequencing of Ebola virus

Global Precision Medicine Alliance

加拿大 Canada

VANCOUVER PROSTATE CENTRE A USC & VGH Centre of Excellence	CHÉOS Centre for Health Evaluation & Outcome Sciences
PROVIDENCE HEALTH CARE Research Institute	ST PAUL'S FOUNDATION
Genome British Columbia	ETC3 Emerging Technologies Centre of Canada and China
BC Cancer Agency CARE + RESEARCH An Agency of the Provincial Health Services Authority	UBC CHILDREN'S HOSPITAL
Deloitte	TELUS HEALTH

美国 U.S.

UW Medicine	
BILL & MELINDA GATES foundation	
The Children's Hospital of Philadelphia	ALLEN INSTITUTE
VANDERBILT UNIVERSITY	
THE UNIVERSITY OF TEXAS MD Anderson Cancer Center Making Cancer History®	

巴西 Brasil

FIOCRUZ PERNAMBUCO

缅甸 Myanmar

--

南非 South Africa

saMRC advancing life

欧盟 EU

NCT NATIONALES CENTRUM VOOR TUMORONKORANKUNGEN, PROELENDEGEN	CENTRE CONTRE LE CANCER LEON BERARD	UNIVERSITY OF DEBRECEN
UMC St Radboud	quirónsalud La salud persona a persona	UNIVERSITÄT DES SAARLANDES
dkfz.	GERMAN CANCER RESEARCH CENTER IN THE HELMHOLTZ ASSOCIATION	HELMHOLTZ CENTRE FOR ENVIRONMENTAL RESEARCH - UFZ
UNIVERSITÄT HAMBURG	BERLIN INSTITUTE OF HEALTH	

俄罗斯 Russian

Saint Petersburg State University	MSU
SECHENOV UNIVERSITY	MGHI

日本 Japan

理化学研究所

中国香港 Hong Kong

香港科技大学 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY	
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澳洲 Australia

AMREP ALFRED MEDICAL RESEARCH & EDUCATION PRECINCT	MONASH University
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BGI sequenced 130 out of 188 major crops , contributing >70% Ag genomics data globally

The collage features several journal covers and research snippets:

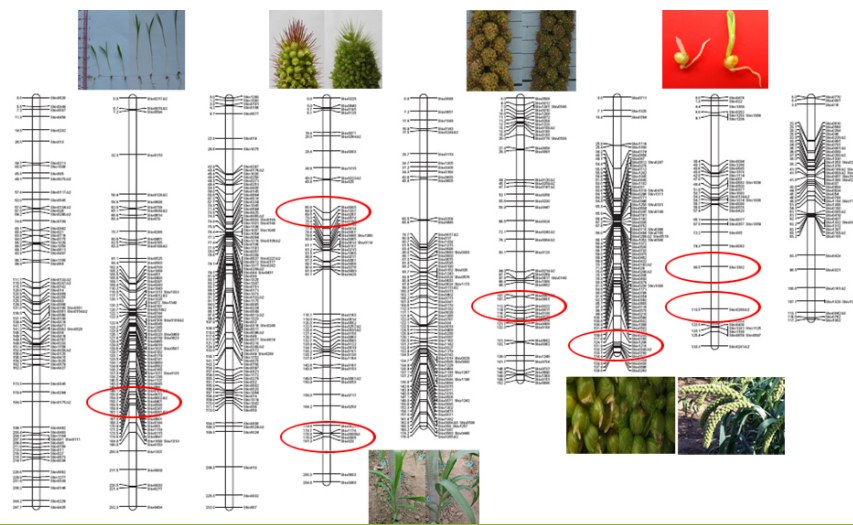
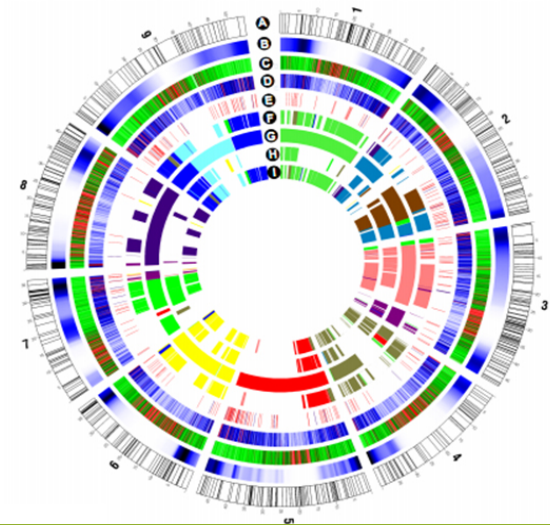
- Science**: "The RICE Genome" - Resequencing 50 accessions of cultivated and wild rice yields markers for identifying agriculturally important genes.
- PLOS BIOLOGY**: "Rice genome evolution Regulation of life span HIV transcription Developing circadian rhythms"
- Nature Biotechnology**: "A Draft Sequence for the Genome of the Domesheik Silkworm (*Bombyx mori*)"
- Nature Genetics**: "Genome-wide transcription analyses in rice using tiling microarrays"
- Science**: "Complete Resequencing of 40 Domesticated Pigeons and Gulls in Silkworm (*Bombyx mori*)"
- nature**: "The chicken genome Cracking the code"
- nature genetics**: "Cucumber genome Parkinson's disease loci Kidney morphogenesis"
- nature**: "100,000+ accessions re-sequencing 300+ trait genes mapped 20+ species under molecular breeding"
- nature genetics**: "THE POTATO GENOME"
- Nature Genetics**: "Maize HapMap identifies common variation in genome in flus"
- Nature Genetics**: "Soybean genome diversity Gene expression in the maize leaf De novo mutations in mental retardation"
- Nature Biotechnology**: "The genome of the mesopolyploid crop species *Bracteantha praecox*"
- Nature**: "The oyster genome reveals stress adaptation and complexity of shell formation"
- nature genetics**: "Diploid cotton genome Human mutation rates Small cell lung cancer genomes"
- Nature Biotechnology**: "Sequencing of allotetraploid cotton (*Gossypium hirsutum* L. ssp. *TM-1*) provides a resource for fiber improvement"
- Nature**: "Bread wheat and BBD0"
- Nature Communications**: "Camelid genomes reveal evolution and adaptation to desert environments"
- Nature Communications**: "The complex jujube genome provides insights into fruit tree biology"
- nature genetics**: "Orchid genome Super-enhancers Pathogenic *Pseudomonas* evolution"
- Nature Genetics**: "Whole-genome sequence of a flatfish provides insights into ZW sex chromosome evolution and adaptation to a benthic lifestyle"
- nature genetics**: "Adaptation and possible ancient interspecies introgression in pigs identified by whole-genome sequencing"

BGI Millet

High-yield millet to provide a sustainable and nutritious resource for modern agriculture

Yield in Xinjiang: >9000kg/ha (data from 2015)

华大基因
BGI



Genome Sequencing

Gene mapping

Products made of millet

BGI Marine



Baguang, Shenzhen



Zhenjiang, Jiangsu



Wenchang, Hainan



Laos Aquaculture Breeding Test and Research Center

Breeding & seed industry

- ◆ Four major breeding bases.
- ◆ High-end breeding
- ◆ Cultivation demonstration

Conservation of Germplasm & GigaData

- ◆ Aquatic GigaData Center
- ◆ Aquatic 10-100-1,000 Genomics Program
- ◆ China National Aquatic GeneBank (CNAG)

4 major system

Seafood and Precise Nutrition

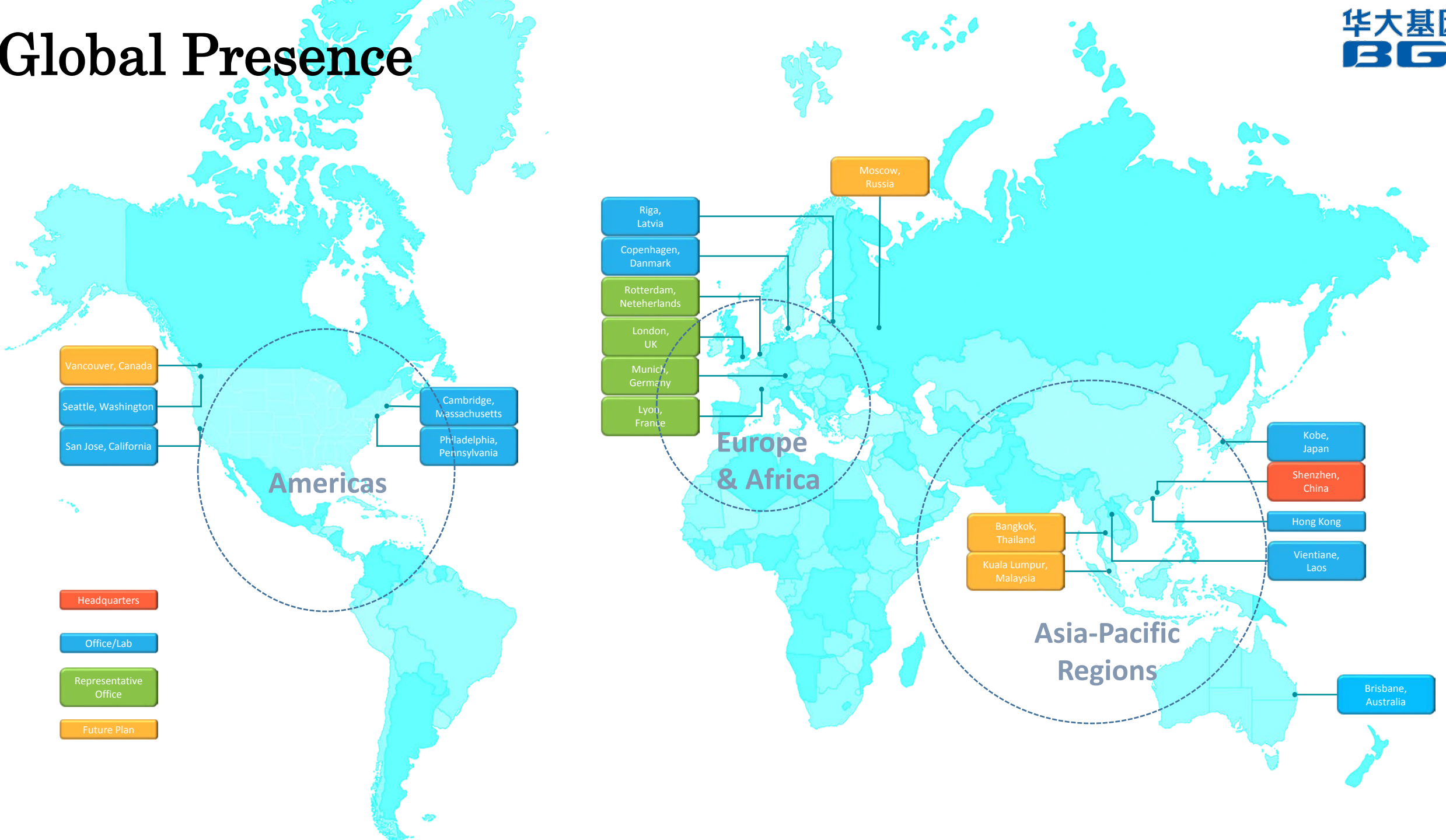
- ◆ Grouper
- ◆ Tilapia
- ◆ Pacific White Shrimp

Domestic & International trade

- ◆ Sturgeons, Caviar
- ◆ Crayfish
- ◆ Chinese Mitten Crab
- ◆ Broiled Eel



Global Presence



Asia-Pacific Regions

➤ Established office/lab in Laos, HK, Japan, Australia, Thailand

➤ BGI service network covers **over 30 countries** in Asia-Pacific Regions



➤ Research Collaboration

- Working with institutes in **over 30 countries**
- Generating over **50 Publications** in GCNNS



BGI Millet:

- Breeding and pilot planting in Malaysia, Australia, Pakistan, the Philippines, etc.



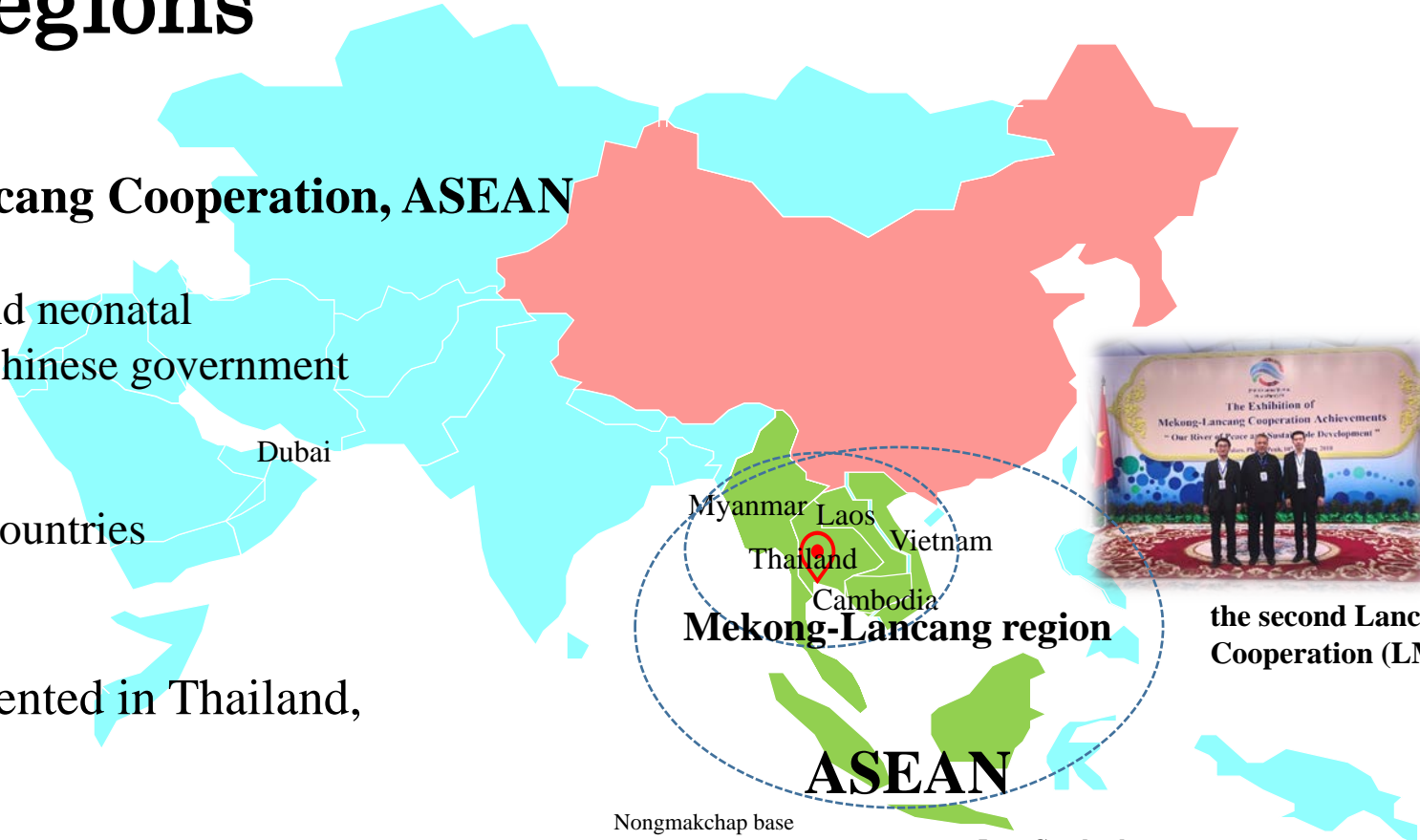
BGI Marine:

- Breeding and marine farming in Australia, Thailand, the Philippines, Sri Lanka, etc.

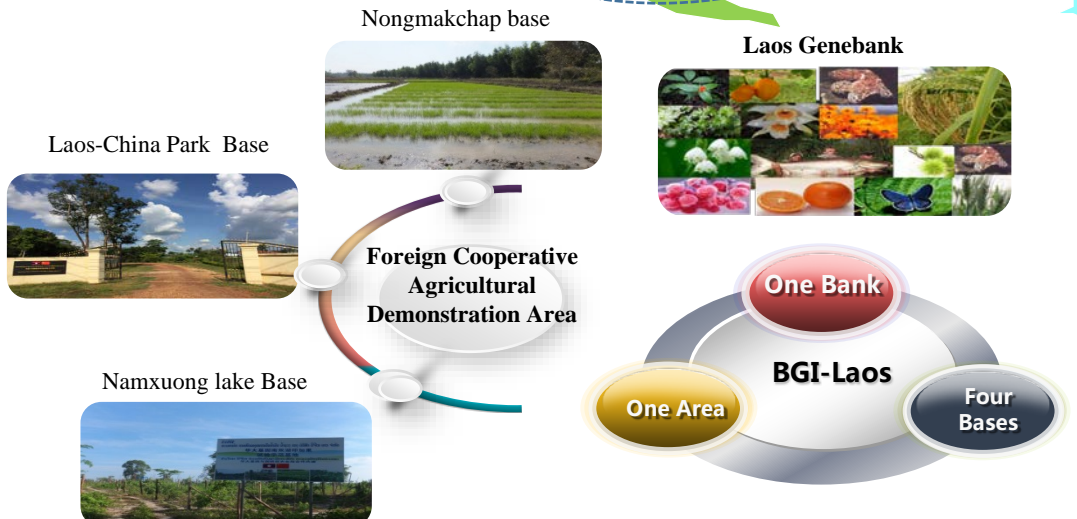
Asia-Pacific Regions

1. Projects with Mekong- Lancang Cooperation, ASEAN

- Free screening of thalassemia and neonatal deafness in Cambodia, funded by Chinese government
- **Population Genome projects**
Thailand → all ASEAN countries
- **Clinical services (NIPT)**
>20,000 screening tests implemented in Thailand, 230 positives cases diagnosed
- **Laos-China modern agricultural science and technology Demonstration Park**

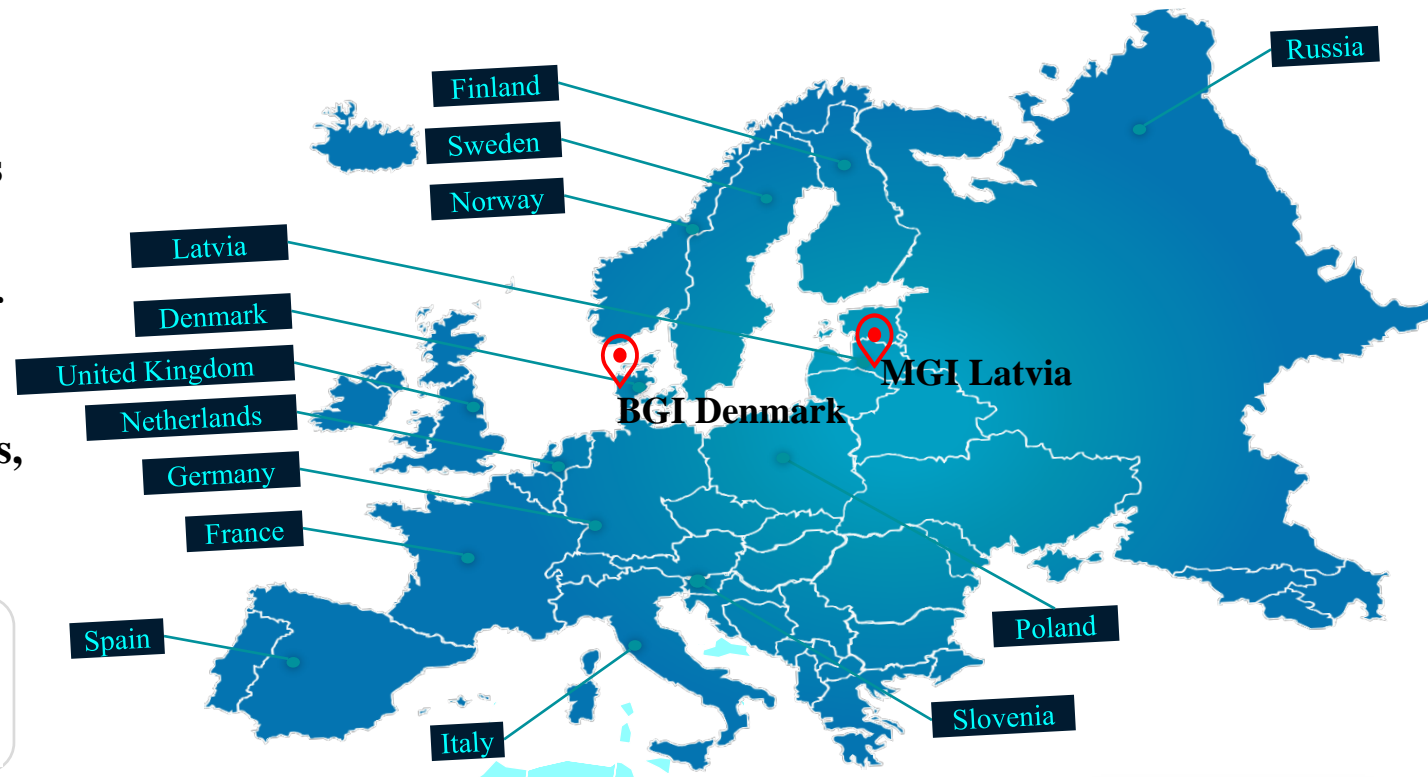


the second Lancang-Mekong Cooperation (LMC) Leaders' meeting

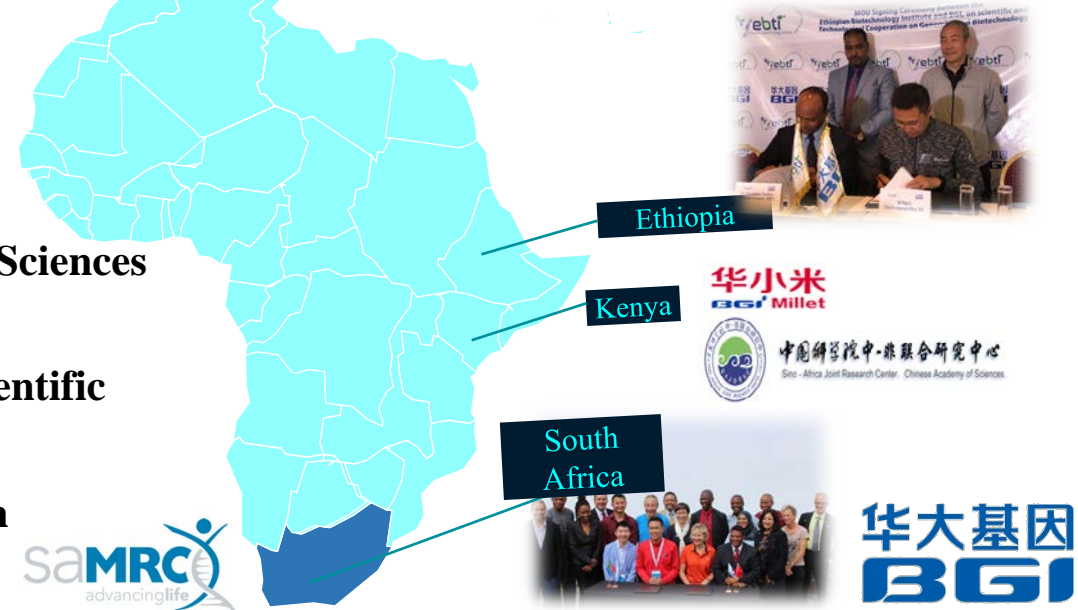


Europe and Africa

- Headquartered in Denmark, BGI service network covers over 30 countries in Europe.
- MGI Latvia: Pivot of MGI's overseas sales, customer support, testing and training for EU countries.
- Collaboration with major biotech and pharma industries, providing reliable services for genome research projects.



- Collaboration with Sino-Africa Joint Research Center, Chinese Academy of Sciences in the research, breeding and planting of millet in Kenya, Africa.
- BGI signed a MoU with the Ethiopian Biotechnology Institute (EBTi) on scientific and technological cooperation and the establishment of genomics research.
- Collaboration with the Medical Research Council of South Africa in building joint research center of Precision Medicine.



Americas

- Seattle Innovation Center focuses on facilitate partnerships and advance joint research and development of BGI with companies and medical institutions in North America
- San Jose Innovation Center focuses on sequencing application development and business incubation.



SEATTLE INNOVATION CENTER

SAN JOSE INNOVATION CENTER

COMPLETE GENOMICS INC.

- Research center in North America for developing next-generation sequencers and applications for academia, clinical, and consumer markets.
- Major collaborators including Genentech, Pfizer, Gilead, Stanford University, Harvard University, NCBI, among others.



- 📍 Office/lab
- 📍 Future plan

Joint research lab focuses on discovering biomarkers of premature birth.



Toronto

- providing comprehensive multi-omics sequencing and bioinformatics services for drug development, agricultural and environmental applications.
- Currently, 18 out of the world's top 20 largest pharmaceutical companies are using BGI services.



BGI AMERICAS

Cambridge
Philadelphia

BGI@CHOP

Joint genome center with Children's Hospital of Philadelphia to conduct human genome sequencing and bioinformatics analysis.



Brazil

To build Joint platform with CAS, Oswaldo Cruz Foundation for research and prevention of infectious diseases in Rio de Janeiro





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Trans-omics for a better life

