Eone-**D**iagnomics **G**enome **C**enter, **EDGC**

EONE-DIAGNOMICS Genome Center

1 History of EDGC

2 Who we are

3 What we do

4 Where we go

5 Business network

HISTORY

Start

2013. 5 — **Foundation of EDGC**

2013. 9

- Contracted a joint research project with DNA Seq (US) for cancer genome analysis driven by quantum computing
- Contracted a joint development project with illumnia (US) for BaseSpace, a cloud-based analysis system

2014. 7

- Launched NIPT of illumina (US) in the local market
- Partnership with BioInnovation (Swiss) for a collaborative research on HAI
- Partnership with Macrogen for collaboration on sequencing-based molecular diagnostics

2014. 12

- Initiated a collaborative project for monitoring adverse reaction in organ transplant with Univ. of Penn (US) and Univ. of Medical Center Utrecht (Netherlands)
- Completed the development of BRCARE™, an gene analysis service for breast cancer
- Certification of venture company (Korea Technology Finance Corp.)

2015.3

- Partnership with Maverix (US) for the cloud-based Bioinformatics Development project
- Partnership with UPenn for collaborative research on Transplantation Genomics

2015. 4

- Partnership with Theragen Etex for collaborative genome analysis business

Vision

2015

Present

Planed to obtain **BI CLIA Approval** for the first time in the world in collaboration with DIAGNOMICS) in June

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WHO WE ARE

- **EDGC (Eone-diagnomics genome center) is a joint venture established by EONE medical foundation and DIAGNOMICS, which is headquartered in Songdo International Free Economic Zone (IFEZ), Incheon, South Korea.**
  - **EONE Medical Foundation**: Founded in 1983, EONE Medical Foundation has over 300 professional staffs. With an enviable customer base consisting of over 4,000 hospitals and clinics across its home country, the clinical consignment expert group carries out over 35 million practices on consignment annually.
  - **DIAGNOMICS** : Headquartered in San Diego, US, DIAGNOMICS is an IGN Development partner of ILLUMINA, a company taking over 70% of entire genome analysis equipment market. Specialized in genomic medicines, DIAGNOMICS is also a certified partner of Intel, the world-largest semiconductor chip maker, in the healthcare business sector.

WHO WE ARE

BRCARE™

Hospital Associated Infection (HAI)

Through genomic analysis-driven digital genome fingerprinting technology and the derived bioinformatics & next-generation sequencing (NGS) technologies, EDGC has also focused on research and development of future-oriented Personalized medical technologies through **personal genomic analysis**.

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WHAT WE DO

NGS
(Next Generation Sequencing)

- ✓ Ultra high-throughput
- ✓ Ultra low-cost Sequencing

Roche – GS FLX

Illumina –Hiseq/ MiSeq

LT – PGM, Proton

WHAT WE DO

DGF
(Digital Genome Fingerprinting)

- ✓ High sensitivity
- ✓ Minimize technical defects and error
- ✓ Application – non-invasive samples including cancer, communicable disease, organ transfer, embryo and health check, which have been a conundrum in the field of molecular diagnostics

EDGC

WHAT WE DO

01

Reproductive and Genetic Health

- Non-Invasive Prenatal Test (NIPT™)
- Personalized Genomic analysis service
- Pre-implantation Genetic Screening (PGS)

02

Oncology

- Breast Cancer genetic service (BRCARE™)
- Comprehensive screening for hereditary cancer (Germ-line)
- Tailored medical diagnosis for cancers (Somatic)

03

New & Emerging

- Monitoring for immune-rejection in organ transplant
- Hospital Associated Infection (HAI)
- Forensic genomics

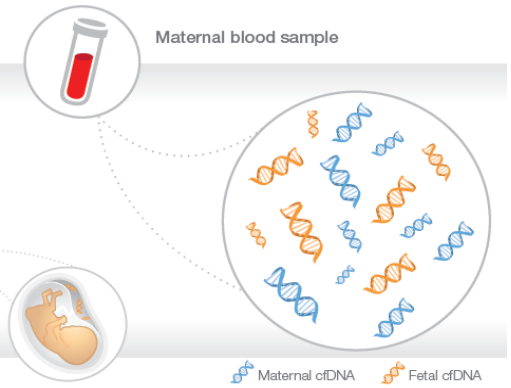
04

Bioinformatics

- BaseSpace App
- My Genome Box (MGB)

WHAT WE DO

Reproductive and Genetic Health



NIPT ?

- ✓ NIPT: Non-Invasive Prenatal Test
- ✓ Isolates a minute amount of fetal DNA from the maternal blood sample and verify the chromosomal aneuploidy of the embryo using massively parallel sequencing (MPS) and bioinformatics
- ✓ Verifies chromosomal aneuploidies such as syndrome (trisomy 21), Edward's syndrome (trisomy 18), Patau's syndrome (trisomy 13), and sex chromosome

Advantage

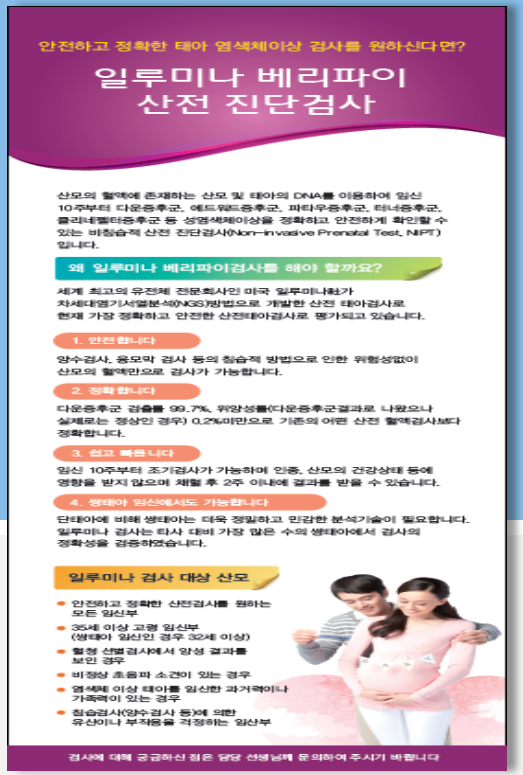
- ✓ Non-invasive test with no risk of a miscarriage
- ✓ Contrasting to conventional screenings, early test is possible from the 10th week of pregnancy
- ✓ 99.9% accuracy of Down's syndrome detection through a simple blood sampling
- ✓ Test results are available in a shorter time
- ✓ Possible for both single and twin pregnancies

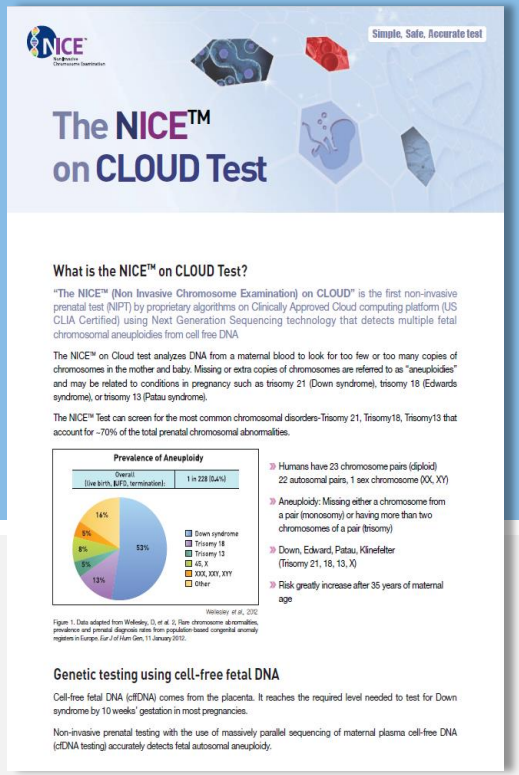
EDGC

WHAT WE DO

Reproductive and Genetic Health - NIPT

- ✓ Illumina – Verifi® test
- ✓ EDGC – **NICE™** test



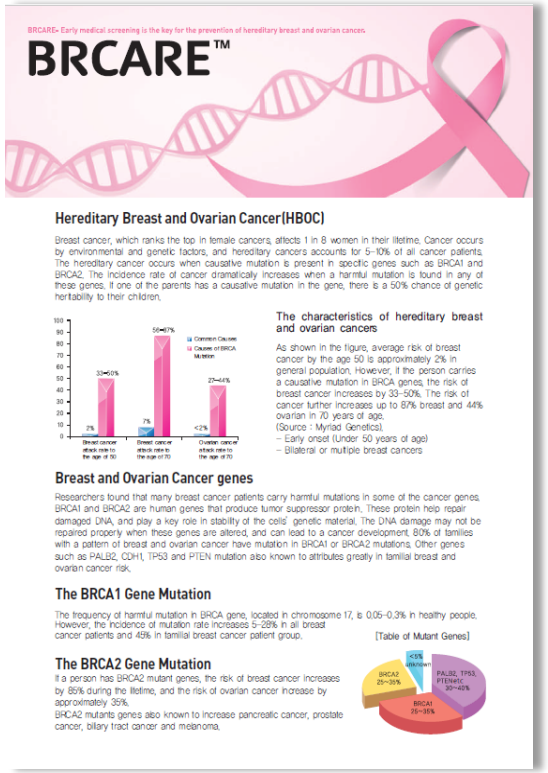


WHAT WE DO

Oncology

BRCARE™?

- ✓ **BRCARE™ Test** verifies any pathogenic mutations through; extracting high purity DNA; sequencing BRCA1/2 genes and comparing the results verified bioinformatics data.
- ✓ Additional RNA-based experimental tests are also taken place to provide accurate reports on the pathogenic relations of the identified mutations.


BRCARE™ Early medical screening is the key for the prevention of hereditary breast and ovarian cancers.

BRCARE™

Hereditary Breast and Ovarian Cancer(HBOC)

Breast cancer, which ranks the top in female cancers, affects 1 in 8 women in their lifetime. Cancer occurs by environmental and genetic factors, and hereditary cancers accounts for 5-10% of all cancer patients. The hereditary cancer occurs when causative mutation is present in specific genes such as BRCA1 and BRCA2. The incidence rate of cancer dramatically increases when a harmful mutation is found in any of these genes. If one of the parents has a causative mutation in the gene, there is a 50% chance of genetic heritability to their children.

The characteristics of hereditary breast and ovarian cancers

As shown in the figure, average risk of breast cancer by the age 50 is approximately 2% in general population. However, if the person carries a causative mutation in BRCA genes, the risk of breast cancer increases by 33-50%. The risk of cancer further increases up to 87% breast and 44% ovarian in 70 years of age.
(Source : Myriad Genetics).
– Early onset (Under 50 years of age)
– Bilateral or multiple breast cancers

Breast and Ovarian Cancer genes

Researchers found that many breast cancer patients carry harmful mutations in some of the cancer genes. BRCA1 and BRCA2 are human genes that produce tumor suppressor protein. These protein help repair damaged DNA, and play a key role in stability of the cells' genetic material. The DNA damage may not be repaired properly when these genes are altered, and can lead to a cancer development. 80% of families with a pattern of breast and ovarian cancer have mutation in BRCA1 or BRCA2 mutations. Other genes such as PALB2, CDH1, TP53 and PTEN mutation also known to attributes greatly in familial breast and ovarian cancer risk.

The BRCA1 Gene Mutation

The frequency of harmful mutation in BRCA gene, located in chromosome 17, is 0.05-0.3% in healthy people. However, the incidence of mutation rate increases 5-28% in all breast cancer patients and 45% in familial breast cancer patient group.

[Table of Mutant Genes]

The BRCA2 Gene Mutation

If a person has BRCA2 mutant genes, the risk of breast cancer increases by 86% during the lifetime, and the risk of ovarian cancer increase by approximately 35%.
BRCA2 mutants genes also known to increase pancreatic cancer, prostate cancer, biliary tract cancer and melanoma.

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WHAT WE DO

New & Emerging

Project for immune-rejection monitoring in organ transplant

- ✓ Aims to increase the survival rate of transferred organs through forecasting and diagnosing any emergency situations which can be derived by any immunological rejections after an organ transfer
- ✓ Driven by an international consortium as a joint project between Univ. of Penn, Children's Hospital of Philadelphia (CHOP), Univ. of Cornell, University Medical Center Utrecht, etc.)

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WHAT WE DO

New & Emerging

Hospital Associated Infection, HAI

Joint Business with BioInnovation for HAI Test

- ✓ Contracted with EDGC for an exclusive sales and collaborative development
- ✓ Plan to apply for a KFDA's approval for in-vitro diagnostics based on NGS

HAI Assay ?

- ✓ Identify the genomic information of pathogens and provide the most effective information to the patient of HAIs to cure the disease by leveraging cutting-edge software applications and databases
- ✓ HAI assay is a Europe CE-certified product that is optimized for HAI monitoring and HAI patient diagnoses

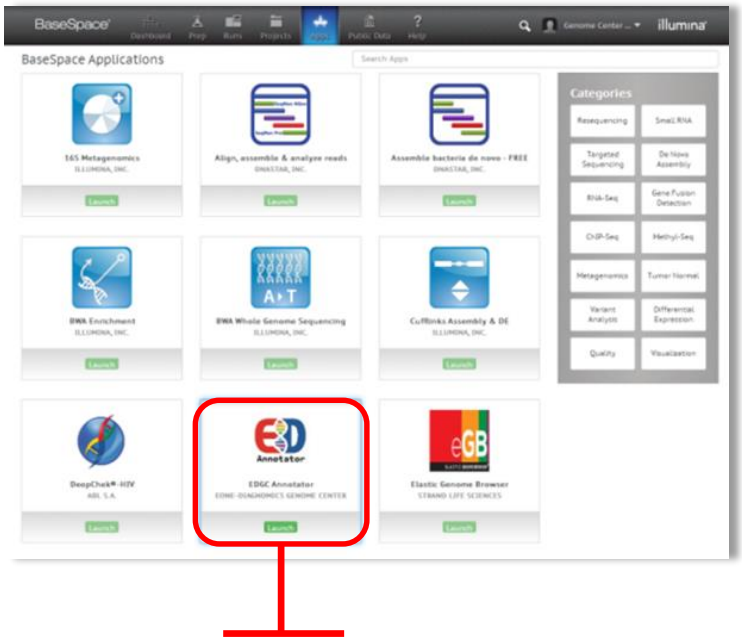
EDGC

WHAT WE DO

Bioinformatics

BaseSpace App

- ✓ EDGC has focused on analysis tools for high value interpretation practices such as biological and clinical interpretations (detecting genes/mutations pertaining to certain diseases or incurable disease)
- ✓ Partnership with illumina: EDGC provided EDGC Annotator to illumine BaseSpace for the first time in the local industry.



EDGC Annotator
Display genomic name and the key functions from NGS sequencing data, connecting to Public DBs (mostly handling disease-related data

WHAT WE DO

Bioinformatics

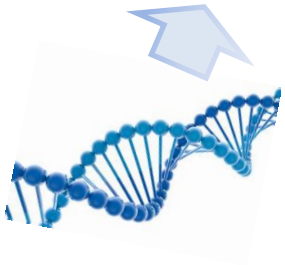
My Genome Box (MGB)

Do it yourself (DIY) using Genome Cloud & App Store

Cloud

Platform (App & App Store)

Social Network



Forming a network based on the app analysis results such as diabetes, diet and constitutions, longevity, alcohol, caffeine, skin type, etc.

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WHERE WE GO

- ✓ Eone-Diagnomics Genome Center (EDGC) provides a professional genomic analysis services for genomic diseases and cancer-centric medicines based on its know-hows on genome interpretation and analysis, differentiated from simple genome analysis and interpretation practices.
- ✓ In addition, EDGC has extended its business portfolio globally based on US and Korean market, stepping forward to become a global leader in the field of genomic diagnostics especially focusing on the markets in the US, China, France, Turkey, Singapore, India, Thailand, etc.

To the World beyond Korea,

Stepping Forward to Be a Global Leader in Genomic Diagnostics

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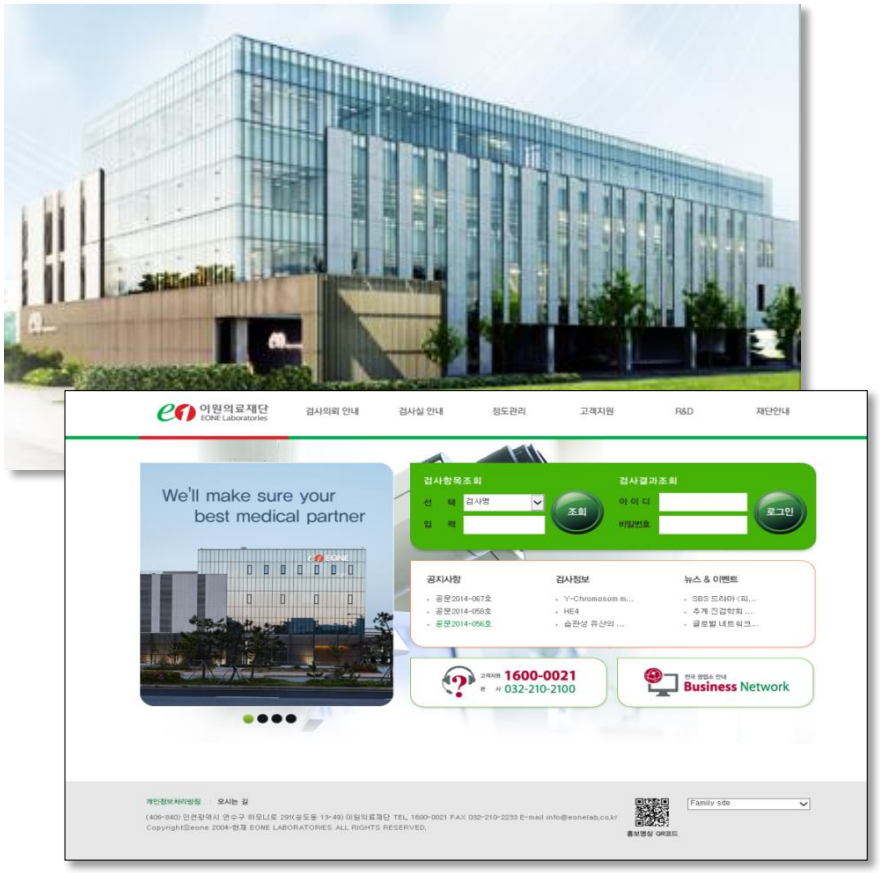
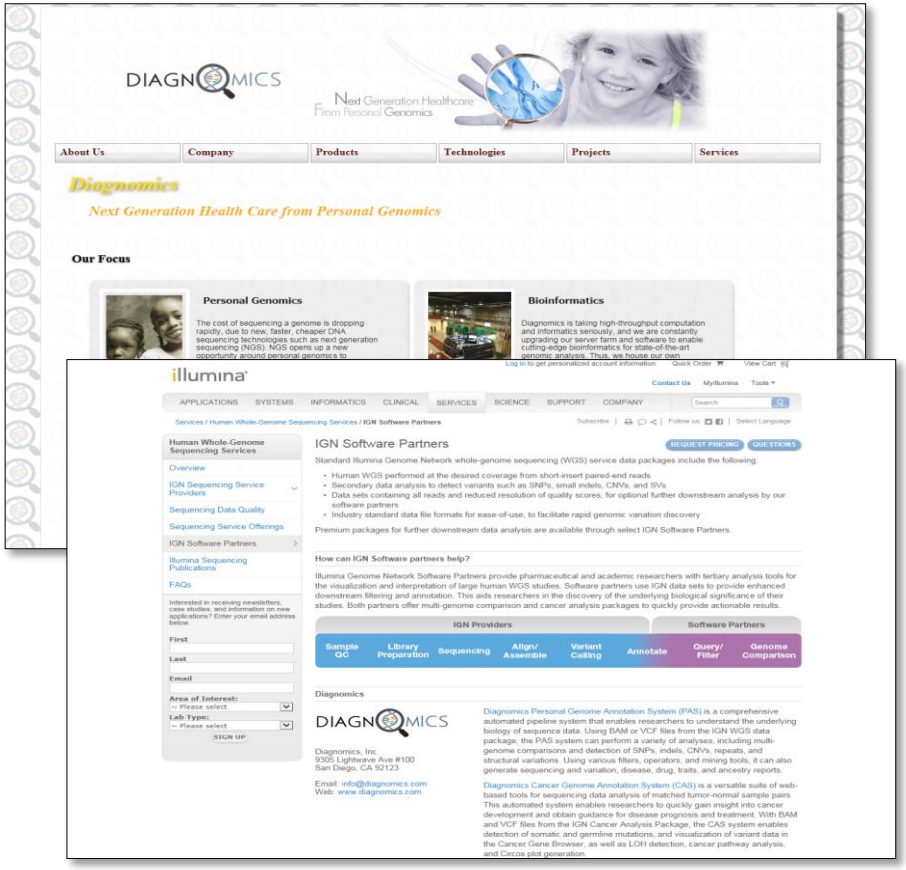
BUSINESS NETWORK



EONE Medical Foundation

- ✓ Founded in 1983, EONE Medical Foundation has over 300 professional staffs and an enviable customer base consisting of over 4,000 hospitals and clinics across its home country. Currently providing approx. 3,000 test and screening services, the nation's largest clinical consignment expert group carries out over 35 million practices on consignment annually.

BUSINESS NETWORK



DIAGNOMICS

- ✓ Headquartered in San Diego, USA, DIAGNOMICS is one of the two certified Bio Informatics partners (DIAGNOMICS and Knome) of ILLUMINA, which owns excellent genomic analysis and bio informatics technologies.
- ✓ DIAGNOMICS is also a certified partner of Intel for the Big Genome Data Solution development. DIAGNOMICS is not only the second largest shareholder of EDGC, but also a sound and robust business partner of EDCG that has been facilitating cross-boarder deals between South Korean and the US.

BUSINESS NETWORK

ILLUMINA

- ✓ Illumina is the most influencing company in the world of genomic analysis, taking up over 70% of the world NGS market.
- ✓ The genomic giant has been involved with EDGC through a partnerships for Genome Network Software Joint Development project, for BaseSpace and Genome Cloud Development initiative and for oncogenomics. Illumina has also cooperating NIPT service business in Korea in a collaboration with EDGC since June 2014.

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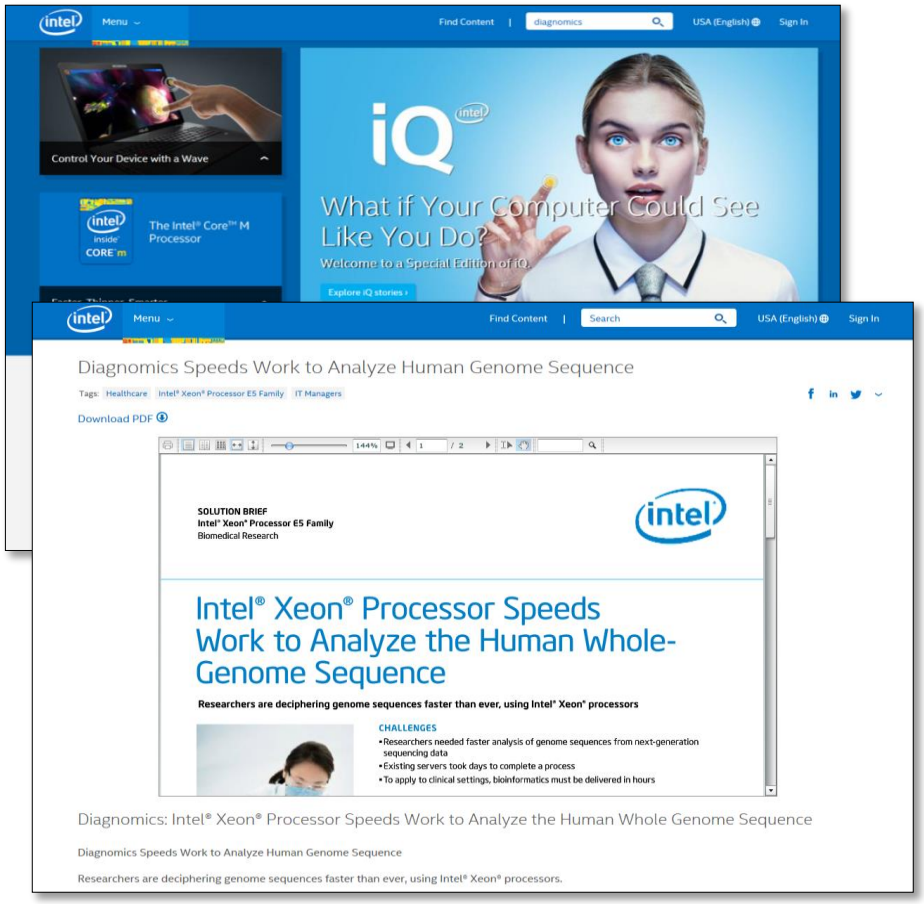
BUSINESS NETWORK



Intel

- ✓ DIAGNOMICS, a certified partner of Intel in the genome application development area, is currently working on a joint project with Intel, which is aiming to develop genomic analysis solutions for new medical technologies in a collaboration with Intel's hardware and software developers.

EDGC

BUSINESS NETWORK

DNA SEQ

- ✓ DNA-SEQ is a joint business of D-Wave and Diagnomics that has commercialized quantum computer technologies for the first time in the world.
- ✓ EDGC is currently working on a joint project with Baylor College of Medicine (US) and DNA-Seq for genomic analysis of cancer patient for customized diagnostics.

WHERE WE GO

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Thank You