09-03-2017

Frankfurter Innovationszentrum
Biotechnologie

New.
German
Engineering.

Welcome to cedem's Collaboration with FIZ Frankfurt Innovation Center.

Tailoring Cancer Treatments for Patients through Genetic Profiling

تفصيل علاجات السرطان بناءً على النمط الجيني للمريض

OptiCancer

About Us

OptiCancer is an innovative project powered by **CEDEM AG (Germany)**.

It is a cancer treatment optimizing solution which we strives to establish throughout the MENA region with the German Genethics Network, backed by FiZ

Our Vision is to implement this market-oriented technology which improves public healthcare by tailoring cancer treatments using genetic profiling through utilizing German capabilities and expertise.

What is FiZ?

The FiZ Frankfurt Innovation Center Biotechnology is a governmentally owned market-oriented nonprofit technology center established in 2002.

It is operated under the ownership of the state of Hesse, the city of Frankfurt, and the Frankfurt am Main Chamber of Commerce and Industry.

HESSEN

STADT FRANKFURT AM MAIN

IHK Industrie- und Handelskammer Frankfurt am Main

What FiZ does

The purpose of the company is to support the development of the biotechnology economy, to promote and maintain the biotechnology potential available, and to establish companies in the biotechnology area in the region.

Global Prospect

Driven by innovation, FiZ realizes that bringing fresh knowhow to the emerging markets promotes their development. The purpose is to adapt existing solutions to the specific needs of the target market.

With the political support from the State of Hesse and the City Council of Frankfurt am Main, FiZ would be pleasured to have you as a global partner in precision medicine.

Network Partners

There are currently 16 tenants companies with about 700 highly specialized employees residing at FiZ and are using a customized infrastructure with access to shared services. FiZ has further network companies, from which 7 are collaborating to bring forward the German Genethics project.

FiZ provides a unique knowledge-and IT infrastructure (House of "New. German Engineering"), on which the individual network companies are coordinated.

The combined capabilities, expertise and experience of the companies and institutions create high additional value and attract other entities to join.

The partners are the following:

OptiCancer

Interxion

Interxion (a server farm and a data center) is the backbone of the highly professional IT infrastructure.

GFE Blut

GFE Blut has an expertise in a high-throughput blood-screening and supports the project in the field of liquid biopsy.

Evolvus

Provides large scale annotation of biological, therapeutic, secondary evidence and clinical data.

Max Planck Research Unit for Neurogenetics

Max Planck Research Unit for Neurogenetics provides a NanoString technology for the gene expression analysis.

Cedem AG Germany

Cedem AG is a pioneer company working in healthcare sector as a leading service provider of healthcare products for emerging markets and the MENA region. CEDEM AG is the sole representative of FiZ in the MENA region.

GenXPro

DNA sequencing, epigenetics, analysis of ctDNA ("Liquid Biopsies") and gene expression analysis as well as bioinformatics.

Dr. Senckenberg Institute of Pathology, University Hospital Frankfurt

The Institute of Pathology provides pathological-anatomical services of histology, as well as molecular pathology services.

Personome Inc.

The American company Personome operates in the area of cancer diagnostics and constructs a complex knowledge base in the field of oncology for clinical interpretation of Precision Medicine datasets.

GERMAN GENETHICS NETWORK PARTNERS

PERSONOME Precision Medicine. Personified. GenXPro cedem Germany evolvus GFE Blut

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Cancer Genomics

Cancer is a disease of the genome, it is caused by changes to genes that control the way our cells function, particularly how they grow and divide. The emerging field of cancer genomics aims to advance personalized medicine through analyzing patient tumor and performing DNA sequencing to find genetic alterations associated with specific cancers.

Precision Medicine

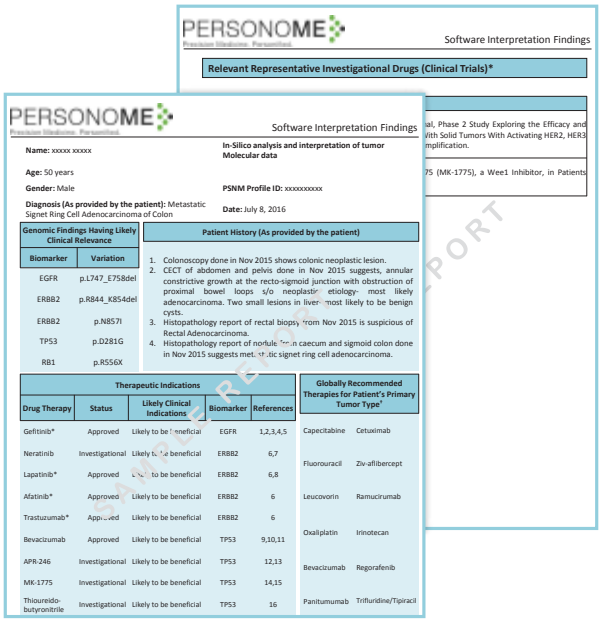
An innovative approach that takes into account individual differences in people's genes, environments, family history and lifestyles to define individual patterns of disease. «One-size-fits-all» treatments are no longer sufficient.

Our Product

We provide the oncologist with a report that contains detailed molecular analysis of the tumor in connection with available therapies, clinical studies and drugs. The treating doctor is thus enabled to make an informed and tailored decision for each cancer patient. Excellent scientific expertise, short turn-over time and reliable German data protection standards are our guiding principles.

Benefits

- More-efficient drug therapies.
- Helping to avoid adverse drug reactions.
- Increasing treatment options.
- Reduce economic burden.



PERSONOME
Precision Medicine. Personalized.

Software Interpretation Findings

Relevant Representative Investigational Drugs (Clinical Trials)*

PERSONOME
Precision Medicine. Personalized.

Software Interpretation Findings

Name: xxxxx xxxxx

In-Silico analysis and interpretation of tumor Molecular data

Age: 50 years

Gender: Male

PSNM Profile ID: xxxxxxxxxx

Diagnosis (As provided by the patient): Metastatic Signet Ring Cell Adenocarcinoma of Colon

Date: July 8, 2016

Genomic Findings Having Likely Clinical Relevance	
Biomarker	Variation
EGFR	p.L747_E758del
ERBB2	p.R844_K854del
ERBB2	p.N857I
TP53	p.D281G
RB1	p.R556X

Patient History (As provided by the patient)

1. Colonoscopy done in Nov 2015 shows colonic neoplastic lesion.
2. CECT of abdomen and pelvis done in Nov 2015 suggests, annular constrictive growth at the recto-sigmoid junction with obstruction of proximal bowel loops s/o neoplastic etiology- most likely adenocarcinoma. Two small lesions in liver- most likely to be benign cysts.
3. Histopathology report of rectal biopsy from Nov 2015 is suspicious of Rectal Adenocarcinoma.
4. Histopathology report of nodule from caecum and sigmoid colon done in Nov 2015 suggests met. adenocarcinoma signet ring cell adenocarcinoma.

Therapeutic Indications

Drug Therapy	Status	Likely Clinical Indications	Biomarker	References
Gefitinib*	Approved	Likely to be beneficial	EGFR	1,2,3,4,5
Neratinib	Investigational	Likely to be beneficial	ERBB2	6,7
Lapatinib*	Approved	Likely to be beneficial	ERBB2	6,8
Afatinib*	Approved	Likely to be beneficial	ERBB2	6
Trastuzumab*	Approved	Likely to be beneficial	ERBB2	6
Bevacizumab	Approved	Likely to be beneficial	TP53	9,10,11
APR-246	Investigational	Likely to be beneficial	TP53	12,13
MK-1775	Investigational	Likely to be beneficial	TP53	14,15
Thioureido-butyronitrile	Investigational	Likely to be beneficial	TP53	16

Globally Recommended Therapies for Patient's Primary Tumor Type†

Capecitabine	Cetuximab
Fluorouracil	Ziv-aflibercept
Leucovorin	Ramucirumab
Oxaliplatin	Irinotecan
Bevacizumab	Regorafenib
Panitumumab	Trifluridine/Tipiracil

SAMPLE REPORT

Report Sample

A solid and safe - German Engineered –reporting service is provided to international clinics and doctors.

OptiCancer

Every Cancer is Unique

Cancer is a disease of the genome, and as we learn more about the molecular changes that are associated with cancer we are able to tailor more effective treatment strategies to the genetic profile of each patient's cancer.

Work Flow

Acquire!

A standard biopsy sample in the form of FFPE or Fresh Frozen is required.

Analyze!

Perform modern DNA Next-Generation sequencing. Comparison of the molecular characterization of the tumor with the cancer treatments using algorithms.

Optimize!

A report with the most suitable treatment options is provided to empower the decision.

Sample Specifications

Preferred Type:	Fresh Frozen
Alternative Type:	FFPE*
Required Material:	• Fresh Frozen samples should have a size of 2 cubic mm and must be placed in a tube containing our storage buffer directly after excision during surgery. • An FFPE sample can be a block or slices. If slices are to be generated, 10 slices of 10 µm are usually enough if they contain at least a 5 mm square area of sample.
Procedure:	The biopsy must be stored/stabilized into the buffer or FFPE solution immediately after excision. The following must be done: 1. Pathological analysis of cancer tissue 2. Identification of specific cancer type 3. Isolation of cancer tissue as to ensure the high reliability of the sequencing results The biopsy must have a good distinction between tumor material and surrounding material. A high amount of tumor material is required.

*Around 20% DNA degraded due to fixation and poor paraffin quality when using FFPE.
For the gene expression analyses as well as to decipher somatic from germ line mutations, it is important that we also to obtain a sample of the healthy tissue.

Our Solutions

We offer targeted sequencing, exome sequencing and ctDNA analysis.
Our standard panel is the Swift Biosciences panel: Accel Amplicon 56G Oncology Panel v2. It is compatible with short DNA fragments from the samples and to generate targeted libraries compatible with Illumina sequencing platforms. This panel utilizes a 263-amplicon design, covering over 16,000 COSMIC mutations and includes 104 exonic.

ABL1	5	CSF1R	2	FBXW7	6	GNAS	2	KIT	14	NPM1	1	SKT11	5
AKT1	2	CTNNB1	1	FGFR1	2	HNF1A	4	KRAS	3	NRAS	3	SMAD4	10
ALK	2	DDR2	1	FGFR2	4	HRAS	2	MAP2K1	5	PDGFRA	4	SMARCB1	4
APC	9	DNMT3A	1	FGFR3	6	IDH1	1	MET	6	PIK3CA	11	SMO	5
ATM	19	EGFR	9	FLT3	4	IDH2	2	MLH1	1	PTEN	14	SRC	1
BRAF	2	ERBB2	4	FOXL2	1	JAK2	2	MPL	1	PTPN11	2	TP53	21
CDH1	3	ERBB4	8	GNA11	2	JAK3	3	MSH6	4	RB1	12	TSC1	1
CDKN2A	2	EZH2	1	GNAQ	2	KDR	9	NOTCH1	3	RET	6	VHL	3

A 263 - amplicom design to generate multiplex libraries compatible with Illumina sequencing platforms

OptiCancer

Optimal Therapy: Data-based optimization of cancer therapies. An innovative approach to match the molecular alterations seen in tumor with the right treatments.

1. Molecular-genetic diagnosis of individual cancerous tissue

Molecular pathways
Imaging and tumor morphology
Genetic signature of tumor
Tumor immune environment

2. Regularly Updated Database

Advanced analytics to correlate information about tumor with outcome information using cumulative knowledge about various cancerous conditions and their treatment.

3. Downloadable Report

The report will be available to be uploaded by the doctor at an **FTP server.** For secure access: the necessary login and password details will be provided to the doctor.

The unique database of our German Genethics network partner combines information from science journals and highly specialized molecular biology databases with the latest research results from clinical trials and knowledge about validated therapies. Through complex algorithms this Smart Data solution can classify the DNA characteristics of each individual sample. Our focus on achieving this data-based optimization of cancer therapies connects the physician to the most updated literature and all the new discoveries linking certain drugs to certain cancers.

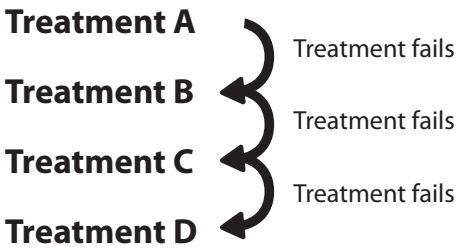
The tumor DNA is sequenced. Afterwards the genomic mutations landscape will be compared to different databases that contain the information from clinical trials and peer reviewed journals about the effects, and treatability of known SNPs (Single-Nucleotide Polymorphism).
The same approach is performed with the gene expression data after correlation to different databases. If no information can be retrieved, a hypothesis driven approach will be used. This approach identifies the treatments which are best suited to antagonize the upregulated pathways of the tumour using databases that contain information about drug effects.
This is carried out under high data German protection standard

OptiCancer

Have you ever met somebody who didn't respond to a drug? Right!

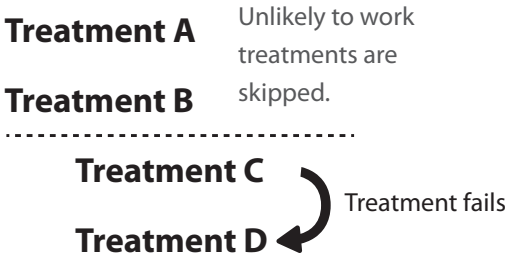
That's because we all metabolize differently and especially that tumors have highly individual genetic outfits.
Treatments that are unlikely to work on patients can be avoided and treatments that are more likely to be beneficial are administered instead. In addition to saving time and money, new treatment options are recommended based on the analysis of the biological pathways taken by the cancer cells.

Traditional Treatments



Confined options

Tailored Treatments



Promising new options

Why Us?

1. Affordable! Favorable price guaranteed

2. Fast data analysis! High computing power

3.Reliable! German data security and process quality standards

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