

**dkfz.**

GERMAN  
CANCER RESEARCH CENTER  
IN THE HELMHOLTZ ASSOCIATION





**MICHAEL BAUMANN**  
Chairman and Scientific Director



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Administrative Director

## RESEARCH FOR A LIFE WITHOUT CANCER

Cancer is an extremely complex disease. Innumerable features distinguish a cancerous tumor from healthy tissue. Thousands of genomic mutations and aberrant epigenetic labels at the level of the cancer genome promote aggressive tumor growth, and no two tumors are alike. Yet not only cancer differs from one individual to the next – so does the body’s immune system fighting the tumor cells.

Scientists at the German Cancer Research Center (DKFZ) are working to decode this complexity step by step, using their findings to benefit patients. They are developing active substances that target carcinogenic cell mutations and are adapting treatments to the individual patient’s disease. Cancer suppresses the immune system, so they are seeking ways of activating it. They are exploring new procedures to gain a picture of the tumor’s aggressiveness and are targeting radiation therapy to achieve millimeter precision. And they are studying how each individual can minimize their cancer risk.

Cancer continues to raise countless questions, however. DKFZ scientists are seeking answers as they engage in basic research at the highest international level. In interdisciplinary teams networked with the best partners, they are constantly exploring how their research findings can improve cancer medicine and help patients.

At the DKFZ, our aim is to ensure that fewer people develop cancer and that cancer can be cured or at least treated so effectively that patients can live and grow old with their disease while enjoying a good quality of life.

**“THE DKFZ IS ONE OF THE  
WORLD’S LEADING CANCER  
RESEARCH CENTERS.”**

–  
Bill C. Hahn,  
Dana Farber Cancer Institute,  
Boston, Chair of the International  
Committee for the Review  
of DKFZ 2018  
–



Is it possible to  
vaccinate against  
tumors?

Which treatments  
are effective against  
cancer stem cells?

What kind of  
lifestyle can help  
prevent cancer?



How do genome mutations cause cancer?

Does MRI help prevent the need for biopsies?

The background of the slide is a photograph of blue horizontal window blinds. A red rectangular frame is superimposed on the image, and the DKFZ logo is centered within the top part of this frame.

dkfz.

How do  
metastases  
develop?

What can we  
learn from the  
tumor genome?

## DKFZ RESEARCH PROGRAMS

*The DKFZ currently has around a hundred scientific divisions, clinical cooperation units, junior research groups, and Helmholtz professorships organized in six research programs. What are the challenges that DKFZ researchers face? Which questions do they hope their research will answer? Here are some examples.*

### RESEARCH PROGRAM A:

#### Cell Biology and Tumor Biology

Are cancer stem cells the source of metastases?

—

Which treatments are effective against cancer stem cells?

—

What role do the blood vessels play in the spread of cancer?

—

Which molecular signals control the development of cells and tissues?  
Do disturbed signals cause cancer?

—

Which metabolic factors promote carcinogenesis?

—

How do cells dispose of their proteins?  
How do they repair errors in the genome?

—

*The scientists from the DKFZ's Cell Biology and Tumor Biology Research Program and the Center for Molecular Biology of Heidelberg University (ZMBH) have been collaborating in a strategic alliance since 2007.*

Six core facilities support DKFZ researchers by providing excellent infrastructure and highly specialized expertise:

**IMAGING AND CYTOMETRY  
OMICS IT AND DATA MANAGEMENT  
CENTER FOR PRECLINICAL RESEARCH  
GENOMICS AND PROTEOMICS  
INFORMATION TECHNOLOGY  
LIBRARY**

## RESEARCH PROGRAM B:

## Functional and Structural Genomics

Which mutations in the genome characterize tumors in adults, and which in children? Which mutations promote cancer growth and would be suitable target structures for new drugs?

—  
How can genomic data be translated into personalized cancer treatments?

—  
How do genes influence each other, and what impact does this have on the pathogenesis of diseases?

—  
How can the huge quantities of data generated by genomic analysis be evaluated?

—  
Can mathematical models help us to understand the complex processes that occur in cells and organs?

## RESEARCH PROGRAM C:

## Cancer Risk Factors and Prevention

What type of behavior increases the risk of cancer, and what lifestyle factors help prevent cancer?

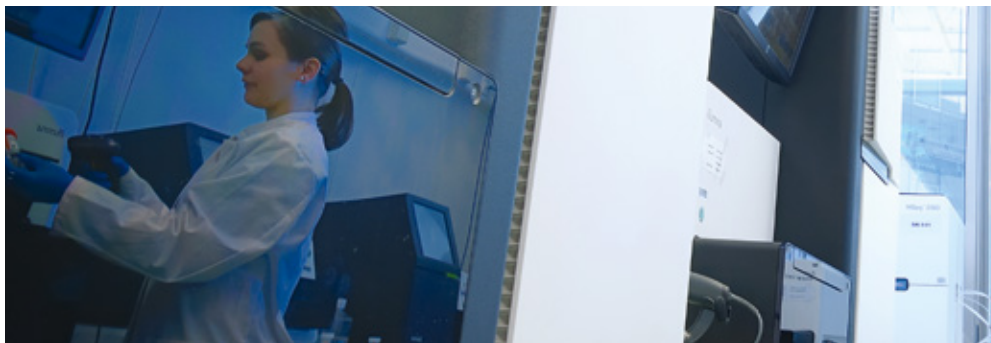
—  
In which types of cancer do hereditary factors play a role, and which genes are responsible?

—  
Which cancer prevention and early detection programs are most effective against cancer?

—  
What factors affect cancer survival? What role do age, place of residence, and education play?

—  
What role does epigenetics play in cancer?

—  
How much sport protects against cancer and improves recovery?





## RESEARCH PROGRAM D: Immunology and Cancer

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Why are the promising immunotherapies not effective in all patients?

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How do the various immune cells develop in the bone marrow?

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Will it be possible to develop a vaccine against brain tumors?

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Which antibodies destroy pathogens or cancer cells?

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## RESEARCH PROGRAM E: Imaging und Radiooncology

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How can even tiny tumors be identified more effectively using imaging methods such as MRI, CT, or PET, either alone or in combination?

---

Can computer programs assist clinicians in treating tumors?

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How can radiotherapy be targeted even more precisely to the individual tumor?

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Which radioactive substances can detect prostate cancer cells and destroy them?

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**RESEARCH PROGRAM F:****Infection, Inflammation and Cancer**

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Does chronic inflammation promote the development of cancer?

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Is it possible to develop a vaccine against Epstein Barr viruses?

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Why can a hepatitis C infection lead to liver cancer?

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Can vaccination against papillomaviruses treat existing pre-cancers?

---

Are there any carcinogenic viruses that are not yet known?

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**ERC GRANTS**

DKFZ researchers are very successful in acquiring prestigious funding from the European Research Council (ERC).

**2017****ERC ADVANCED GRANTS**

Bernd Bukau

Tobias Dick

Hans-Reimer Rodewald

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**ERC CONSOLIDATOR GRANT**

Aurelio Telemann

**2018****ERC ADVANCED GRANTS**

Hellmut Augustin

Christof Niehrs

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**ERC STARTING GRANTS**

Ana Banito

Fabian Erdel

Moritz Mall

---

**ERC SYNERGY GRANT****ERC PROOF OF CONCEPT GRANT**

Michael Boutros

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**2019****ERC CONSOLIDATOR GRANT**

Stefan Pfister

## PARTNERS THROUGHOUT GERMANY

The DKFZ is a member of the Helmholtz Association, Germany's largest scientific organization – with more than 39,000 employees in 19 research centers. In addition, the DKFZ is engaged in a large number of partnerships and research alliances. The DKFZ implements joint projects with partners from the scientific community, the private sector and society, including those described below.

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### HI-STEM

The Institute for Stem Cell Technology and Experimental Medicine was founded as a public-private partnership with the Dietmar Hopp Foundation and focuses on cancer stem cell research.

### DKFZ-ZMBH ALLIANCE

The alliance between the DKFZ and the University of Heidelberg's Center for Molecular Biology (ZMBH) reinforces Heidelberg's position as one of the world's leading centers for the molecular life sciences.

### HI-TRON MAINZ

The DKFZ is collaborating with TRON – Translational Oncology at the University Medical Center of Mainz University in the new HI-TRON Helmholtz Institute.

The aim of the partnership is to develop powerful immunotherapies and identify new biomarkers for the effectiveness of personalized treatment.

### BAYER HEALTHCARE

Established back in 2009, the aim of the strategic research alliance between the DKFZ and Bayer HealthCare is to develop innovative treatment options for cancer patients. Together, the two partners initiate promising projects that have a good chance of reaching clinical practice and hence benefiting patients. They also run the Joint Immunotherapeutics Lab together.



**PATIENT PARTICIPATION  
IN CANCER RESEARCH**

The **PATIENT ADVISORY COUNCIL FOR CANCER RESEARCH** supports the DKFZ and the DKTK in better integrating the patient perspective into research projects. Another aim is to enhance the public's understanding of modern cancer research.

## EXAMPLES OF OUR INTERNATIONAL PARTNERSHIPS

### NEW AGREEMENTS

Partnership with the **Princess Margaret Cancer Center**, Toronto, Canada

### MD ANDERSON CANCER SISTER INSTITUTION AGREEMENT (HOUSTON, TEXAS)

Jointly financed cooperation projects, short-term stays for young researchers

### LOVIT

Laboratory of Oncolytic-Virus-Immuno-Therapeutics – a binational research institute jointly run by the **Luxemburg Institute of Health** and the DKFZ

### CURRENTLY BEING SET UP

**Athens Comprehensive Cancer Center**: The Helmholtz Association is funding the partnership as part of its European Partnering Program and hopes that by doing so it will help promote research in Europe.

### CANCER CORE EUROPE

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The six leading European cancer centers are stepping up cooperation in the field of cancer research and oncology across national borders. The partners are the DKFZ/NCT Heidelberg, the [Gustave Roussy Cancer Campus](#) (France), the UK's [Cambridge Cancer Center](#), the [Karolinska Institute](#) (Sweden), the [Netherlands Cancer Institute](#), and the [Vall d'Hebron Institute of Oncology](#) (Spain).

### AT THE PLANNING STAGE

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Partnership with the [Tianjin Medical University Cancer Institute and Hospital](#) (Tianjin, China)

### DKFZ-MOST-COOPERATIONAL RESEARCH PROGRAM

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The Cooperational Research Program between the DKFZ and the Israeli Ministry of Science and Technology (MOST) has been supporting scientific cooperation between researchers at the DKFZ and at academic institutes in Israel for 43 years. It has promoted almost 200 projects to date, leading to 1,520 publications in reputed scientific journals.



Does sport improve  
the chances of  
recovery from  
cancer?

How can genomic  
data be translated  
into personalized  
cancer treatments?



## NATIONAL CENTER FOR TUMOR DISEASES (NCT) HEIDELBERG AND DRESDEN

At its sites in Heidelberg and Dresden, the National Center for Tumor Diseases (NCT) has set itself the task of linking research and patient care as closely as possible.

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The NCT Heidelberg was established in 2004 as a joint institution of the DKFZ, Heidelberg University Hospital, the Faculty of Medicine in Heidelberg, and German Cancer Aid.

The NCT Dresden was set up in 2015 as the second NCT site after Heidelberg. It is a joint institution of DKFZ, Dresden University Hospital, the Medical Faculty of TU Dresden, and the Helmholtz Center Dresden-Rossendorf.

Cancer patients at the NCT are treated using the very latest scientific findings. At the same time, the proximity of laboratory and clinical practice gives NCT researchers key impetus for their research with a practical focus. The NCT tries to provide every patient with individualized treatment – across traditional disciplines and academic departments in line with modern precision oncology.

The NCT sites in Heidelberg and Dresden are leading oncologic centers of German Cancer Aid.

### PATIENT CONTACT

—  
NCT HEIDELBERG  
→ +49 6221 56-4801

—  
NCT DRESDEN  
→ +49 351 458-4500

## THE GERMAN CONSORTIUM FOR TRANSLATIONAL CANCER RESEARCH

Successful cancer research can only reach patients if physicians and cancer researchers work hand in hand. In the German Consortium for Translational Cancer Research (DKTK), research institutes and university hospitals cooperate closely with the DKFZ as the core center at eight different locations.

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The DKTK promotes interdisciplinary cancer research and conducts clinical and epidemiological studies to examine how findings from basic research can be used to promote the prevention, early detection, diagnosis, and personalized treatment of cancer. The aim is to speed up the transfer of new diagnostic and therapeutic approaches to clinical practice.

The DKTK develops instruments across all its sites to offer tailor-made treatment for each patient.

**DKFZ HEIDELBERG** *(core center)*

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**DKTK BERLIN**

—

**DKTK DRESDEN**

—

**DKTK ESSEN/DÜSSELDORF**

—

**DKTK FRANKFURT / MAINZ**

—

**DKTK FREIBURG**

—

**DKTK MUNICH**

—

**DKTK TÜBINGEN**

—







PATIENT CONTACT KITZ

—

→ +49 6221 568381

## THE HOPP CHILDREN'S CANCER CENTER HEIDELBERG

The Hopp Children's Cancer Center Heidelberg (KiTZ) is a joint pediatric oncology institution run by the DKFZ, Heidelberg University Hospital, and the University of Heidelberg.

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KiTZ is both a treatment center and a research institute for oncologic and hematologic diseases in children and young people. It aims to unravel the biology of pediatric cancer and serious blood disorders and to integrate promising research approaches effectively into patient care.

At KiTZ, children with cancer, particularly those for whom there are no established treatment options, receive an individual treatment plan drawn up by an interdisciplinary team of experts. Many young patients can take part in clinical studies, thus gaining access to new treatment options. KiTZ plays an exemplary role in transferring research results from the laboratory to clinical practice.



Für eine  
Kindheit  
ohne  
KREBS



## TRAINING AND CAREER DEVELOPMENT

The DKFZ attaches great importance to excellent and continued training during all stages of the scientific career.

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DKFZ scientists organize and supervise the Cancer Biology Major course as part of the Master's program on **MOLECULAR BIOSCIENCES** held in English at the University of Heidelberg.

The **HELMHOLTZ INTERNATIONAL GRADUATE SCHOOL FOR CANCER RESEARCH** supervises structured training for some 500 PhD students. The curriculum covers the entire range of current cancer research topics. Contact: [HIGS@DKFZ.DE](mailto:HIGS@DKFZ.DE)

A total of 120 trainees on six different training courses and students on six dual study courses are currently undergoing training at the DKFZ.

Doctoral students from the **GERMAN-ISRAELI HELMHOLTZ RESEARCH SCHOOL IN CANCER BIOLOGY** benefit from the strengths of the two institutions, the DKFZ and the Weizmann Institute.

The **DKFZ CAREER SERVICE** supports students, doctoral students and postdocs in planning their professional future.

Interdisciplinary training in top-level cancer research projects: **DKFZ POSTDOCTORAL FELLOWSHIP PROGRAM**.

**HEIDELBERG SCHOOL OF ONCOLOGY**: The NCT, the DKFZ, and Heidelberg University Hospital jointly organize a training program for scientists and physicians that covers both clinical and translational research and interdisciplinary patient care.

### THE DKFZ'S LIFE SCIENCE LAB

This program is open to students in the 8th grade and older and includes independent work on current research topics under the guidance of science mentors along with weekend seminars and holiday academies.

[www.life-science-lab.org](http://www.life-science-lab.org)



**0800 4203040**

daily from 8 am to 8 pm

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[krebsinformationsdienst@dkfz.de](mailto:krebsinformationsdienst@dkfz.de)

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[www.krebsinformationsdienst.de](http://www.krebsinformationsdienst.de)



## DO YOU HAVE QUESTIONS ABOUT CANCER? WE'RE HERE TO HELP.

Information for patients, family members, interested individuals, and health professionals: The Cancer Information Service of the German Cancer Research Center was set up in 1986 as a contact point for people with questions about cancer. We take time for your questions, whether by phone, by email or at our offices in Heidelberg and Dresden.

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We provide information that is tailored to the individual situation, help to analyze the facts, and provide support when difficult decisions have to be made. We supply up-to-date news, background knowledge, and suggested links on the internet and organize discussions on Facebook.

Health professionals can turn to the Cancer Information Service for sound scientific facts and sources that draw on the best available evidence. The Cancer Information Service is a free service provided by the DKFZ, financed by public funding.


### SERVICE FOR HEALTH PROFESSIONALS

Use knowledge to good effect:  
A service for health professionals  
→ [krebsinformationsdienst.med](https://krebsinformationsdienst.med)

0800 4304050  
Monday to Friday  
from 8 am to 8 pm  
kid.med@dkfz.de

## TIMELINE

**28 Jan 1964** The Government of Baden-Württemberg establishes the German Cancer Research Center (DKFZ) as a foundation in Heidelberg **3 Mar 1964** Karl Heinrich Bauer is appointed Foundation Representative **31 Oct 1964** Inauguration of the first buildings (INF 502) **25 Sep 1972** Inauguration of the main building (INF 280) after four years of construction **2 May 1975** The DKFZ becomes a large-scale research institute and a member of the consortium of large-scale research institutes (AGF) **28 Sep 1976** Contract for future 90:10 financing by Federal and State Governments **28 Jun 1977** The DKFZ becomes a member of the German Research Foundation (DFG) **1 May 1986** Founding of the Cancer Information Service KID **12 Sep 2001** DKFZ becomes a member of the Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V. (Helmholtz Association of German Research Centers) **1 Jul 2004** Founding of the National Center for Tumor Diseases (NCT) Heidelberg **25 Jan 2006** Strategic alliance with Siemens Healthcare **7 Dec 2007** Establishment of the alliance between the DKFZ and the Center for Molecular Biology in Heidelberg (ZMBH) **25 Apr 2008** Signing of the Sister Institution Agreement with MD Anderson Cancer Center in Houston, Texas **3 Sep 2008** Establishment of the Advisory Council **17 Sep 2008** Establishment of HI-STEM together with the Dietmar Hopp Foundation **26 Nov 2008** Research alliance with Bayer Healthcare **10 Dec 2008** Harald zur Hausen receives the Nobel Prize for Medicine **20 Oct 2010** Completion of the four-year comprehensive refurbishment of the DKFZ's main building **2 Nov 2010** Inauguration of the NCT building **29 Oct 2012** Official launch of the German Consortium for Translational Cancer Research (DKTK) **31 Oct 2014** 50th anniversary of the DKFZ **10 Dec 2014** Stefan Hell receives the Nobel Prize for Chemistry **1 Jan 2015** Founding of the NCT Dresden **23 Nov 2016** Founding of the Hopp Children's Cancer Center KITZ **1 Aug 2018** Founding of HI-TRON **29 Jan 2019** Start of the National Decade Against Cancer **29 Jul 2019** First DKFZ branch outside Heidelberg set up in Dresden **31 Jul 2019** Founding of the DKFZ-Hector Cancer Institute at the University Medical Centre Mannheim **17 Sep 2019** Inauguration of the Research Center for Imaging and Radiooncology



How do genes influence one another?

How do altered cell signals lead to cancer?

## THE DKFZ IN FIGURES

322,200,000 euros total budget for 2020 (including funding for the DKTK and the NCT extension), of which 238,300,000 is provided by the state, 90% by the German Ministry of Education and Research, 10% by the Ministry of Science, Research, and Art of Baden-Württemberg (and the research ministries of Bavaria, Berlin, Hesse, North Rhine-Westphalia, Rhineland-Palatinate, and Saxony), 33,800,000 euros of project grants and 45,950,000 euros of the DKFZ's own revenue. 3,164 employees (as at Dec 2019, excluding associate staff), of whom 1,006 are scientists, 372 are PhD students, and 124 are trainees. In addition, 895 associate staff members work at the DKFZ, of whom 321 are scientists and 237 PhD students. 693 foreign employees (= 22% of the total staff) come from 78 different countries.

### INNOVATION MANAGEMENT

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At the interface between research and industry, the *Innovation Management Division* aims to harness the innovation potential of research at the DKFZ for commercial purposes.

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[DKFZ.DE/DE/TECHTRANS/  
INDEX.HTML](https://www.dkfz.de/de/techtrans/index.html)

The DKFZ is a member of the Helmholtz Association of German Research Centers.



The **ADVISORY COUNCIL** of the DKFZ brings together leading figures from the private sector, politics, and public life.

The members regard themselves as ambassadors of the DKFZ. They draw on their long-standing experience to advise the DKFZ and use their contacts to build relations and access new resources.



**Private research support**  
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**[spende@dkfz.de](mailto:spende@dkfz.de)**

Get in touch with us – we'd love to have you at our side. Please do not hesitate to contact us if you have any questions about donations or legacies.

**Account for donations**  
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