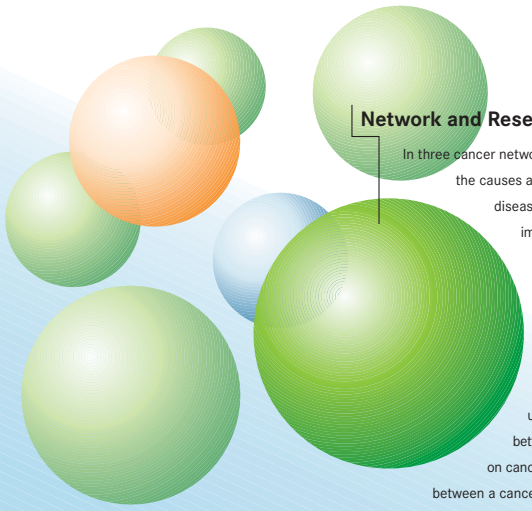
Genome Network

Cancer



Network and Research

In three cancer networks with different main focus the causes and appearance of cancerous diseases are invastigated. Their aim is to improve the prevention, diagnosis, prognosis and treatment of cancer. Almost all human cells can develop into tumor cells. Today more than **a hundred different cancerous diseases** with quite varying clinical pictures are identified. Most processes concerning the origin and spread of tumors are still unknown. To understand these mechanisms better, scientists in the genome network focusing on cancer are trying to discover all the differences between a cancer cell and a healthy cell. Besides this basic knowledge about the origin and development of tumors in general, they are also conducting research on **breast cancer, colon cancer, rectal cancer, brain tumors, leukemia** and **malignant lymphoma.**

”The NGFN is providing the necessary infrastructure to bring together all of Germany and to facilitate the collaboration of surgeons, oncologists, pathologists, molecular biologists, medical technologists, scientists in bioinformatics and last but not least the patients. In addition to the **interdisciplinary expertise, great apparative expense** is necessary for our research, which the individual laboratories prior to the beginning of the NGFN could not afford to this extent. Gene expression analysis on microchips plays a central role here and has already led to important new insights into leukemias, breast cancer and colon cancer.”

PD Dr. Roland Stauber, Frankfurt

”One constantly reads something about breast cancer – that does cause anxiety. **The risk of getting breast cancer** is supposed to be inherited and one can not influence it. That’s why I think it’s good that genome research is trying to discover which genes play a role in breast cancer. Then perhaps physicians will be able **to diagnose cancer earlier** and **treat it**.”

Barbara H., bookseller

Example Breast Cancer

Breast cancer (mamma carcinoma) is the most common form of cancer among women in Germany. One in ten women will be diagnosed with this tumor in the course of her life. The causes for the onset of breast cancer are not known. Until now, scientists have assumed that certain factors increase the risk for the disease. Among the greatest **risk factors** are age (from age thirty on the probability of getting breast cancer increases) and if the mother or sister has been diagnosed with breast cancer. About five percent of breast cancers are due to **inherited disease-related gene mutations**. Moreover, women who have a first pregnancy at a late age or who have never been pregnant at all, or who have their first period early and who enter menopause late have an increased risk. Long-term intake of female hormones (estrogens), fatty diets, and tobacco and alcohol consumption may also increase the risk of breast cancer

Combating Cancer

It is also especially important to detect breast cancer in the early stage of the disease, because the chances of a cure are best then. Palpitation and mammography are suitable methods for detecting a breast tumor early.

In recent years scientists have discovered **three tumor genes**. A mutation in two of the three genes increases the breast cancer risk by 85 percent. Women who have one of these gene mutations should have regular medical check-ups at short intervals in order to be able to begin a treatment **early enough**

Right Therapy from the Start

Breast-conserving surgery is possible for 65 percent of the women with the disease. This is always followed by radiation therapy and usually also chemotherapy. However, not every tumor responds to chemotherapy, so that some patients suffer in vain from the burdensome side effects of this therapy. With the aid of **high-throughput technology**, scientists of the NGFN were able to identify genes that make it possible to predict whether chemotherapy will be successful in a breast cancer patient or not. Thus, **valuable time** can be gained in the treatment of the disease. If it turns out that a breast cancer patient would not respond well to chemotherapy, **another treatment** can immediately be initiated.

And the patient is spared the unpleasant side effects of chemotherapy

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