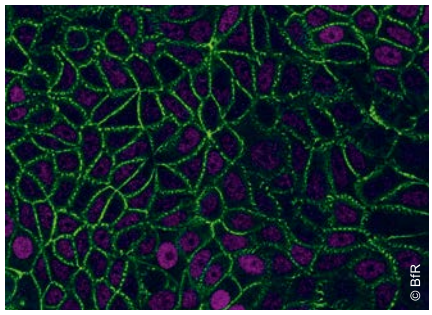


A protein links the envelopes of neighbouring cells like a molecular rope.

How oestrogen encourages the growth of breast cancer

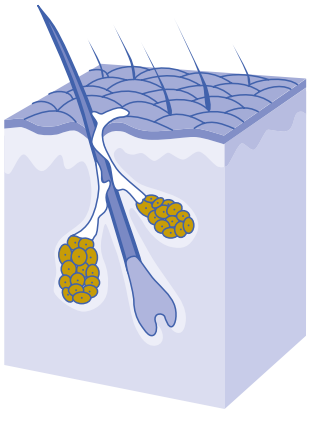
Breast cancer is one of the most commonly diagnosed types of cancer in the world with over two million new cases annually. High oestrogen levels can promote both the development and the migration of cancer cells from the tumour (metastasis). Research carried out by scientists at the German Centre for the Protection of Laboratory Animals at the BfR is contributing to a better understanding of the hormone's effects. The strength of the connections between the individual breast cancer tumour cells is mainly conveyed by the thread-like protein E-cadherin. It anchors neighbouring cells like a molecular rope. Findings from cell culture experiments and clinical patient samples indicate that oestrogen can permanently weaken these cell-cell connections. The hormone not only influences the number of E-cadherin connections, but also how they are arranged. This new and clinically relevant observation allows the development of novel test methods without animal experiments.

More information:
Bischoff, P. et al. 2020. Estrogens determine adherens junction organization and e-cadherin clustering in breast cancer cells via amphiregulin. iScience 23:101683. DOI: 10.1016/j.isci.2020.101683

Cell workshop on trial

Influences from the environment, chemicals or sunlight can damage our genetic material (DNA) and, in doing so, increase the cancer risk. Cells can counteract this damage with repair mechanisms and what are known as "cell cycle checkpoints". Scientists at the German Centre for the Protection of Laboratory Animals at the BfR have now examined a cell cycle control mechanism in more detail exploring checkpoint protein 2 (CHK2 protein) – a protein that usually stops damaged cells from dividing further. In doing this, they are making an important contribution to cancer research. it was known that mutations in this protein lead to a twofold increased risk of breast cancer. However, this has not been observed for lung cancer. The research results show that breast cells require a functioning CHK2 protein to counteract DNA damage whereas Lung cells can compensate for a depletion of the protein. This explains why CHK2 gene mutations lead to an increased risk of breast cancer, but not lung cancer.

More information:
Van Jaarsveld, M. T. M. et al. 2020. Cell-type-specific role of CHK2 in mediating DNA damage-induced G2 cell cycle arrest. Oncogenesis. 9, 35. DOI: 10.1038/s41389-020- 0219-y



Von HairFollicle.png: User:Helix84derivative work: Tsaitgaist (talk) - HairFollicle.png, Gemeinfrei, https://commons.wikimedia.org/w/index.php?curid=6910140

Sebaceous glands improve skin models

Artificial skin models are accepted alternatives to animal experiments, for example, for testing chemicals for skin irritation. Additional skin components have to be integrated so that these models can be used to investigate additional chemical effects and other scientific questions. One major focus is on sebaceous glands, which are essential for normal skin function. Despite new findings on their regulation via the endocrine and nervous system, many properties of these glands remain insufficiently investigated. This is because their structure is complex and the "secretion process" is unique: during secretion, the gland cells, which are full of lipid droplets, disintegrate and are secreted as sebum through the hair canal. The German Centre for the Protection of Laboratory Animals at the BfR follows and supports global research on sebaceous glands – for better skin models and for the protection of laboratory animals.

More information:
Zouboulis, C.C. et al. 2020. Sebaceous gland: Milestones of 30-year modelling research dedicated to the "brain of the skin". Exp Dermatol. 2020 Sep 2. DOI: 10.1111/exd.14184