

## Skin Cancer: Basal Cell Cancer (BCC) and Melanoma (Malignant Melanoma)

[See online here](#)

Neoplasms of the skin can be hard to differentiate clinically, but they can have very different consequences. Although the colloquially called “white skin cancer” describes rather harmless changes of the skin, the “black skin cancer” is feared. Since patients often consult doctors from specialties other than dermatology about skin changes, it is helpful to know the most common types of skin cancer.



Basal-Cell Carcinoma - Aggressive and Local



Image: „Basal-cell carcinoma on the cheek“ by Josef Wienand.  
License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

**Basal cell carcinoma, or basaloma, is the most common neoplasm of the skin.** It is a nonmelanoma skin cancer (NMSC) that forms de novo from basal [cells](#), which means that it is not based on a precancerous condition. Basal cell carcinoma solely affects the skin with hair and usually appears in areas exposed to ultraviolet (UV) radiation from the sun. The most common locations are the face, head, and neck: approximately 80% of all basal cell carcinomas appear on the connecting line between the corner of the mouth and the earlobe.

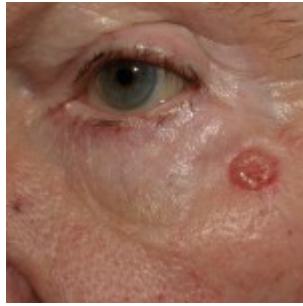
## Risk Factors of Basalioma

1. Mutations, which can be evoked by years or decades of chronic exposure to UV radiation, cause the formation of basal cell carcinoma, and people with fairer skin are more susceptible.
2. In addition to causing mutagenesis, excessive exposure to sunlight can also depress the immune system.
3. Arsenic exposure may also lead to the malignant degeneration of basal cells.
4. Exposure to radiation (x-rays) is another risk factor.

## Characteristics of Basalioma

- Basal cell carcinoma almost never metastasizes. However, it grows locally and can cause significant damage to the surrounding tissue.
- Sun exposure is the most common cause of basal cell carcinoma, but areas not exposed to the sun are considered to have a genetic susceptibility for basal cell carcinoma.
- Lesions appear as pearly translucent to flesh-colored raised areas of skin, which may contain tiny blood vessels ([telangiectasia](#)) and are sometimes characterized by ulcers (Image 1).
- In large basal cell carcinoma, bleeding, oozing, and crusting frequently develop.

## Types of Basalioma



[Image](#): „Nodular Basal cell carcinoma in 75-year-old man.“ by Klaus D. Peter. License: [CC BY 3.0 DE](#)

Based on morphologic features, there are various types of basal cell carcinoma:

- **Nodular basal cell carcinoma (Image 2):** This type is characterized by single or multiple central nodules having a string-of-pearls margin and telangiectasias (small dilated [blood vessels](#)).
- **Superficial:** This type is caused by a superficial proliferation of neoplastic basal cells.
- **Infiltrative basal cell carcinoma:** This type penetrates into the dermis in thin strands between collagen fibers.

## Diagnosis and treatment



[Image](#): „High magnification micrograph of a basal cell carcinoma. H&E stain.“ by Nephron. License: [CC BY-SA 3.0](#)

**Basal cell carcinomas** are curable and can be treated with topical medications, surgery, or various therapies.

**Surgical excision** is the criterion standard in therapy, subsequent to clinical and histologic confirmation of the diagnosis. The tumor is excised, adequate safety margins are obtained, and histologic follow-up of the cutting edges is performed. In areas where extensive excision is impossible for aesthetic reasons (i.e. the face), the tumor should be excised under constant intraoperative examination of the margins of resection (so-called **micrographic controlled excision**). Mohs micrographic surgery is used for tumors that are difficult to excise.

Alternatively, superficial tumors may be treated with **cryotherapy, photodynamic therapy, or local chemotherapy**. In cases of inoperable **basal cell carcinoma**, **radiotherapy** is the treatment of choice. Furthermore, hedgehog pathway inhibitors were recognized in 2013 as alternative treatments for nonresectable basal cell carcinoma. Arsenic trioxide and itraconazole are the hedgehog pathway inhibitors often prescribed.

Radiation therapy is used for older patients, and topical fluorouracil is used for the treatment of superficial basal cell carcinoma.

After curative therapy has taken place, periodic (yearly) follow-ups are suggested because there is a high risk of developing further primary tumors.

**Notes regarding basal cell carcinoma:**

- Almost no metastasis, local infiltration of the surrounding tissue
- Most common on face
- String-of-pearls margin and telangiectasias
- Micrographic controlled surgery is the therapy of choice, yearly check-ups

## Malignant Melanoma – Silent and Spreading

Not the most common type of skin cancer but probably the most well known, malignant melanoma involves the **malignant degeneration of melanocytes**. It **accounts for more than 90% of the deaths caused by skin cancer**.

**Different subtypes of melanoma:**

<b>Superficial spreading melanoma</b>	<b>Lentigo maligna</b>	<b>Acral lentiginous melanoma</b>	<b>Nodules melanoma</b>
<ul style="list-style-type: none"> <li>• Associated with previously present nevus</li> </ul>	<ul style="list-style-type: none"> <li>• Commonly in sunburnt areas</li> </ul>	<ul style="list-style-type: none"> <li>• Most commonly on palmar, plantar, subungual and mucosal surfaces</li> <li>• Common in dark-skinned individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Very vertical growth phase melanomas</li> </ul>

Chronic UV light exposure, damage caused by sunlight including sunburns (especially during childhood and adolescence), fair skin type, and cumulative appearance of melanocytic nevi (>100) or presence of dysplastic nevi represent significant risk factors. The most important risk factor is exposure to sunlight, particularly UVB radiation.

## Risk factors

1. **Cutaneous melanomas** of the head and neck are significantly more likely to occur in people with high levels of total sun exposure. Conversely, melanomas on the trunk tend to develop in people with lower levels of ambient sunlight exposure but also in those who experience higher levels of recreational exposure on the chest and back.
2. A changing mole is considered to be the most important clinical risk factor associated with cutaneous melanoma
3. Age: Sunburns early in life, age older than 50 years, and exposure to UV radiation from tanning beds are other factors in the development of melanoma.
4. Fair skin phenotype: People who burn easily, such as those with fair or red hair, blue eyes, and light-colored skin, are most prone to developing melanoma.

5. **Nevi:** The presence of freckling and benign nevi also indicates an increased risk for melanoma development. The number of nevi appears to be more important than the size. The presence of more than 100 benign-appearing nevi in adults or more than 50 clinically normal nevi in children increases risk. Additionally, a patient with any atypical or dysplastic nevi is at heightened risk.
6. Presence of xeroderma pigmentosum or familial atypical mole melanoma syndrome.
7. Previous melanoma: Patients with previously diagnosed melanoma are also at increased risk, and 5%–10% eventually develop a second primary melanoma.
8. Sex difference: Women are more likely to be affected on the upper thigh, whereas men tend to be affected on the upper body.

Note: Malignant melanoma, unlike basal cell carcinoma, **often appears on areas of the body that are not exposed to sunlight.**

Based on morphologic and histologic aspects, there are **4 types** of malignant melanoma:

- **Superficial spreading melanoma** (60%), which first grows in width and later on in depth. Lesions are flat and irregular in shape.
- **Nodular melanoma** (20%) has rapid nodular growth and primarily grows in depth, which is why it has a worse prognosis.
- **Lentigo maligna melanoma** (10%) is a melanoma commonly found in older people. It is caused by hyperpigmentation (lentigo senilis), and lesions tend to be wide and initially grow horizontally before growing in thickness (good prognosis). Lesions are large, flat, and brownish.
- **Acral lentiginous melanoma** (5%) also grows horizontally at first and is usually found in the area of the palm of the hand, the soles of feet, or around the affected person's fingernails. The Hutchinson sign, which refers to a spread onto the periungual skin, is a characteristic clinical sign.

## Diagnosis-ABCDE-mnemonic

Metastasis of malignant melanoma can occur **by lymphatic or by hematogenous spread**. As a consequence of locoregional spread, metastases can appear elsewhere on the patient's skin (satellite metastases). The liver, skeleton, and brain are among locations where distant metastases are commonly found.

The **ABCDE mnemonic** is a popular method for the early detection of melanoma. Nevi that meet 1 or more of the following criteria should undergo further evaluation with a reflected-light microscope (dermatoscopy).

- A (asymmetry) = asymmetric shape
- B (border) = irregular margin and indistinct border
- C (color) = varying pigmentation
- D (diameter) = larger than 5 mm
- E (elevated, evolving) = raised appearance or any changes, such as in size or shape

If dermatoscopy confirms a primary tumor, complete surgical excision with adequate surgical margins (0.5 cm) is performed, and the excised skin undergoes a histopathologic examination. In the case of histologic confirmation of a malignant tumor, skin margins

must be resected depending on the tumor thickness (see below) and depth of tumor invasion: A melanoma in situ (tumor does not penetrate the basal lamina) has to be removed, including a safety margin of 0.5 cm (so that no further resection is necessary). For a melanoma that has grown across the basal lamina, the following safety margins apply (according to the S3 guideline):

- Tumor thickness  $\leq 2$  mm: 1 cm
- Tumor thickness 2–4 mm: 2 cm

**Note: Breslow depth** is defined as the histologically determined depth of infiltration in millimeters, starting from the granular layer of the epidermis. It is a determining criterion for the prognosis of the melanoma and defines the T stage of TNM classification.

After histologic analysis of malignant melanoma is complete, **clinical staging** should follow based on histopathologic findings. This includes searching for lymph node metastases using lymph node sonography, chest radiography in 2 planes, abdominal sonography, and skeletal scintigraphy. To exclude distant metastases, a whole-body computed tomography scan and magnetic resonance imaging should be considered.

## Treatment

The therapy of choice for malignant melanoma is **surgical excision**. Adjuvant therapy does not yield higher survival rates. However, patients with progressed tumor stages may benefit from adjuvant immunotherapy using **interferon  $\alpha$** . Any metastases should be treated with adequate methods (i.e. **surgical resection, radiotherapy**).

### Immunotherapy:

The latest innovation in melanoma therapy is **immunomodulation**. The monoclonal antibody ipilimumab was approved by the US Food and Drug Administration in 2011. Ipilimumab reinforces the body's own immune reaction against tumor cells by blocking their receptors, which induces downregulation of the immune response. In this way, the tolerance that the body established against the growing tumor cells is impaired. A similar mechanism is used by the PD1-inhibitor nivolumab. According to current data from ongoing trials, the combination of nivolumab and ipilimumab seems to be promising, but it also shows significant adverse effects.

### Notes regarding melanoma:

- Early lymphogenous spreading
- Most commonly located on women's thighs or men's torsos
- ABCDE mnemonic helps with early recognition
- T stage is defined by Breslow depth
- Excision is the therapy of choice; safety margin depends on the tumor depth

## References

Becker, M., Hahn, H., Hahn, H., & Dobbstein, M. (2015). *Wif1 Inhibits the Growth of Basal Cell Carcinoma*.

Clark, W. H. (1979). *Human malignant melanoma*. New York: Grune & Stratton.

Cohen, A. B. (1992). *Nurses' knowledge of screening for basal cell carcinoma, squamous*

*cell carcinoma and malignant melanoma*. Place of publication not identified: publisher not identified.

Reinhard Dummer, Mark R. Pittelkow, Keijilwatsuki, Adèle Green, & Nagwa M. Elwan. (2011). *Skin Cancer – A World-Wide Perspective*.

Stockfleth, E., & SCOPE Collaborative Group. (2009). *Skin cancer after organ transplantation*. New York: Springer.

**Legal Note:** Unless otherwise stated, all rights reserved by Lecturio GmbH. For further legal regulations see our [legal information page](#).

Notes