# Pathologie Bochum

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# Sarkome

## Pathologie und Molekularpathologie

**Ingo Stricker**
Institut für Pathologie Ruhr-Universität Bochum

# Weichteiltumoren

## Epidemiologie

Inzidenz: ca. 1,5-2 pro 100.000 Einwohner

1% aller malignen Tumoren des Erwachsenen

ca. 15% kindlicher/juveniler Tumoren.

Lokalisation:

| | |
|---|---|
| 60% | Extremitäten |
| 20-35% | retro-/intraperitoneal (einschl. GIST) |
| 15-20% | Körperstamm |

# Weichteiltumoren

Übersicht benigne / maligne

| Ursprung | Benigne | Maligne |
|---|---|---|
| Muskeln | Rhabdomyom | Rhabdomyosarkom |
| Fett | Lipom | Liposarkom |
| Bindegewebe | Fibrom | Fibrosarkom |
| | Aggressive Fibromatose | |
| Glatte Muskeln | Leiomyom | Leiomyosarkom |
| Gefäße | Hämangiom | Angiosarkom |

# Sarkome

## Übersicht Tumorentitäten nach WHO

| | | |
|---|---|---|
| lipogen | **Liposarkom** | myxoid / rundzellig<br>dedifferenziert, pleomorph |
| | lipomähnlich (ALT) | |
| (myo-) fibroblastisch | **Fibrosarkom** (adult)<br>**Myxofibrosarkom**<br>**Low grade fibromyxoid Sarkom** | |
| undifferenziert | **Undifferenzierte Sarkome** | pleomorph, spindelzellig,<br>Riesenzell-haltig, rundzellig |
| glatt-muskulär | **Leiomyosarkom** | |
| skelett-muskulär | **Rhabdomyosarkom** | embryonal<br>pleomorph, alveolär |
| vaskulär | **Hämangioendotheliom**<br>**Angiosarkom** | epitheloid |
| chondro-ossär | **Extraskelettales Osteosarkom**<br>**Mesenchymales Chondrosarkom** | |
| „uncertain“ | **Epitheloides Sarkom**<br>**Synoviales Sarkom**<br>**PNET** | |

# Sarkome

## Häufigkeiten der Entitäten

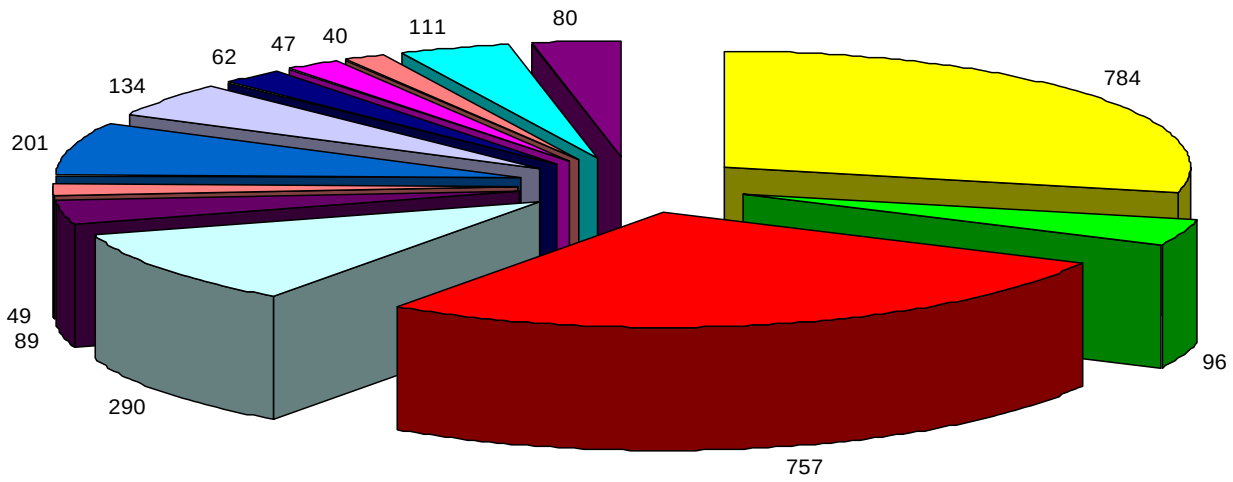
| | |
|---|---|
| Liposarkome | 15-25% |
| Leiomyosarkome | 10-15% |
| undifferenzierte Sarkome (früher MFH, NOS) | 15-25% |
| Synovialsarkome | 6-10% |
| GIST | 3-5% |
| Maligne periphere Nervenscheidentumoren (MPNST) | 3-5% |
| Fibrosarkome | 2-3% |
| Angiosarkome | 2-3% |

# Sarkome

## Häufigkeiten der Entitäten

### Weichteil-Sarkome

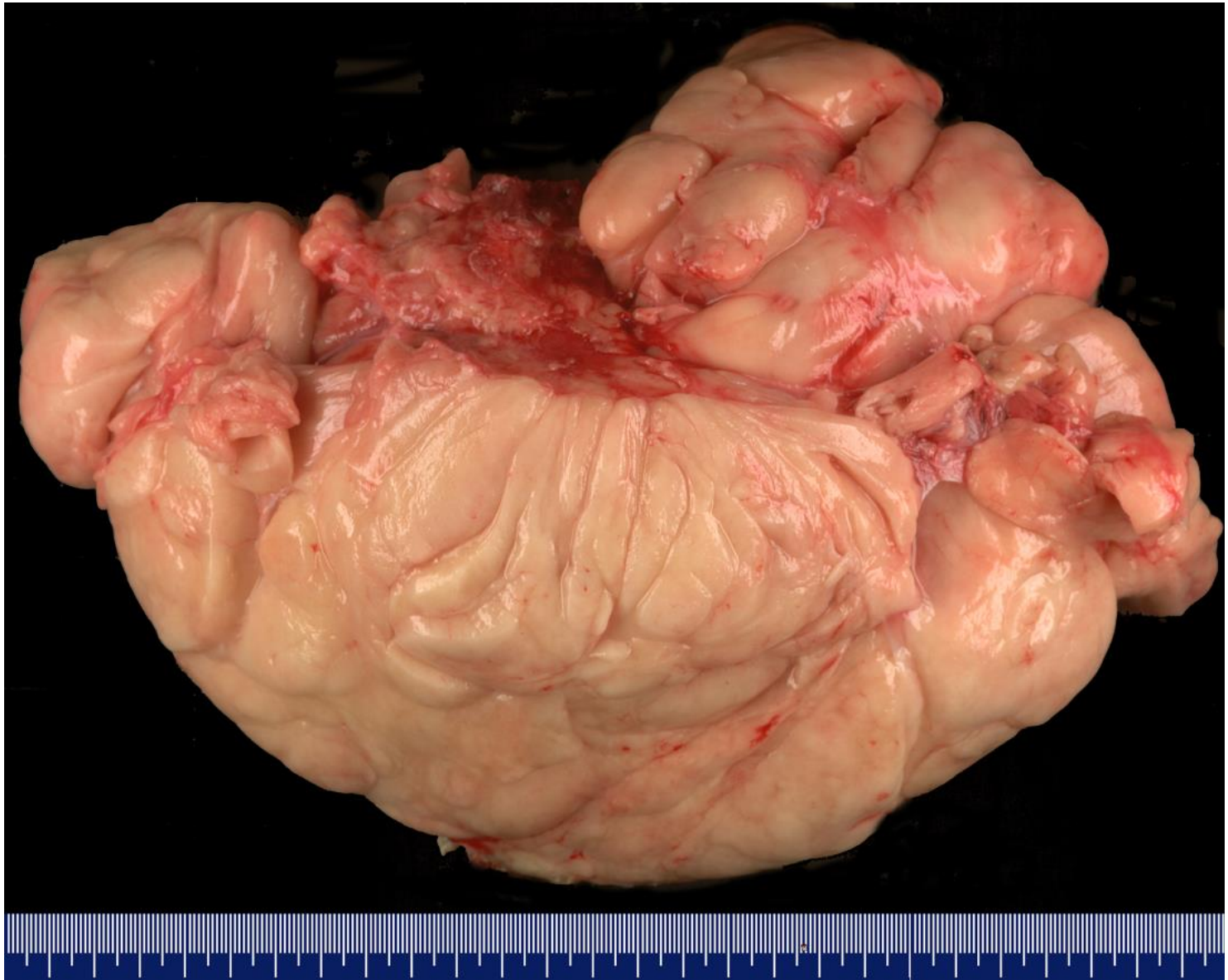
Datenauszug aus dem Weichteiltumorregister des Instituts für Pathologie Bochum
Stand Mitte 2012, Gesamtsumme n=3011




- MFH
- Fibrosarkom
- Liposarkom
- Leiomyosarkom
- Rhabdomyosarkom
- Angiosarkom
- Synovialsarkom
- MPNST
- Epitheloides Sarkom
- Extraskelettales Ewing- Sarkom / PNET
- Klarzellsarkom
- spindelzelliges Sarkom
- DFSP

# „Liposarkom“

Atypischer lipomatöser Tumor - ALT
(Gut differenziertes lipomähnliches Liposarkom)



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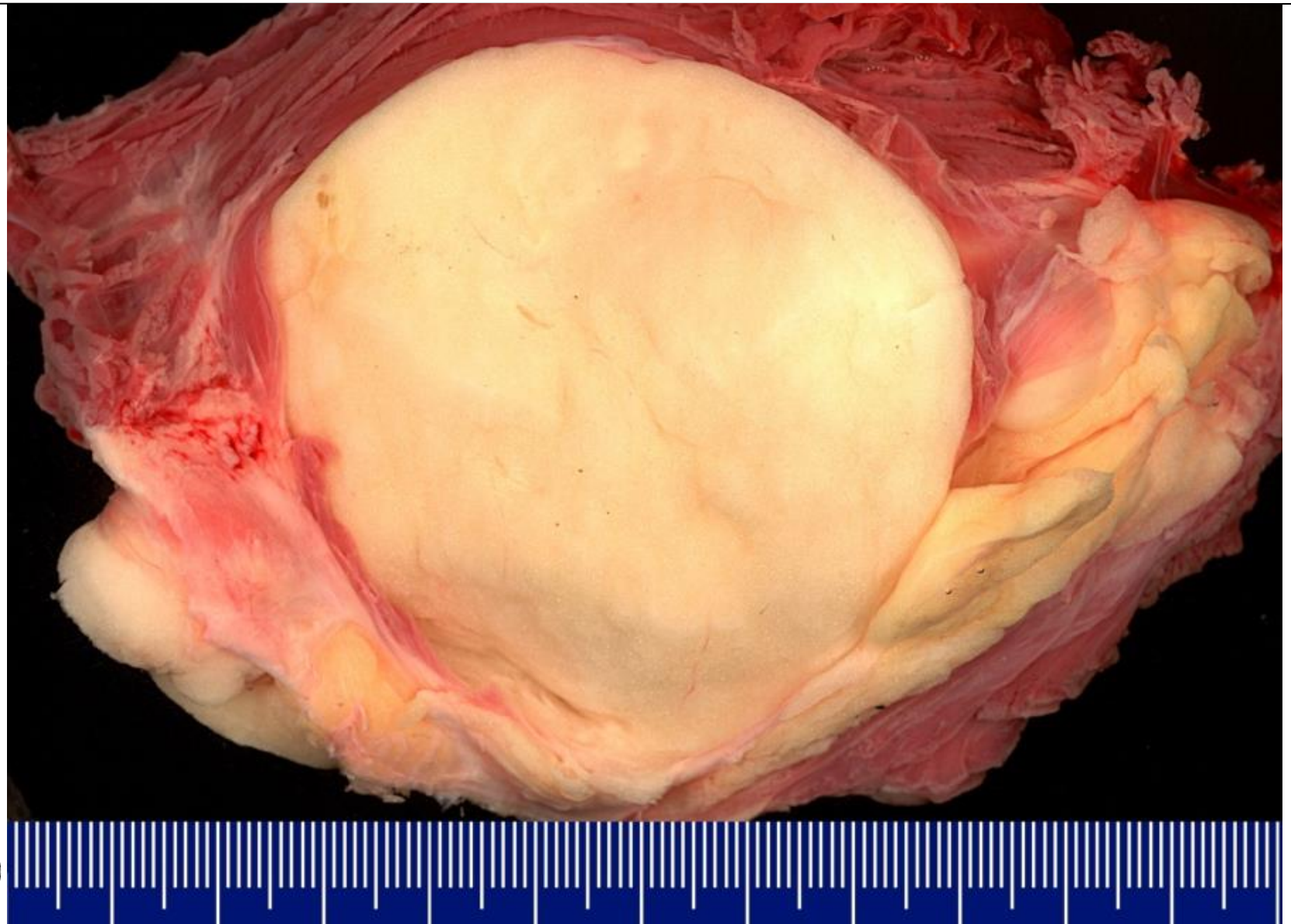

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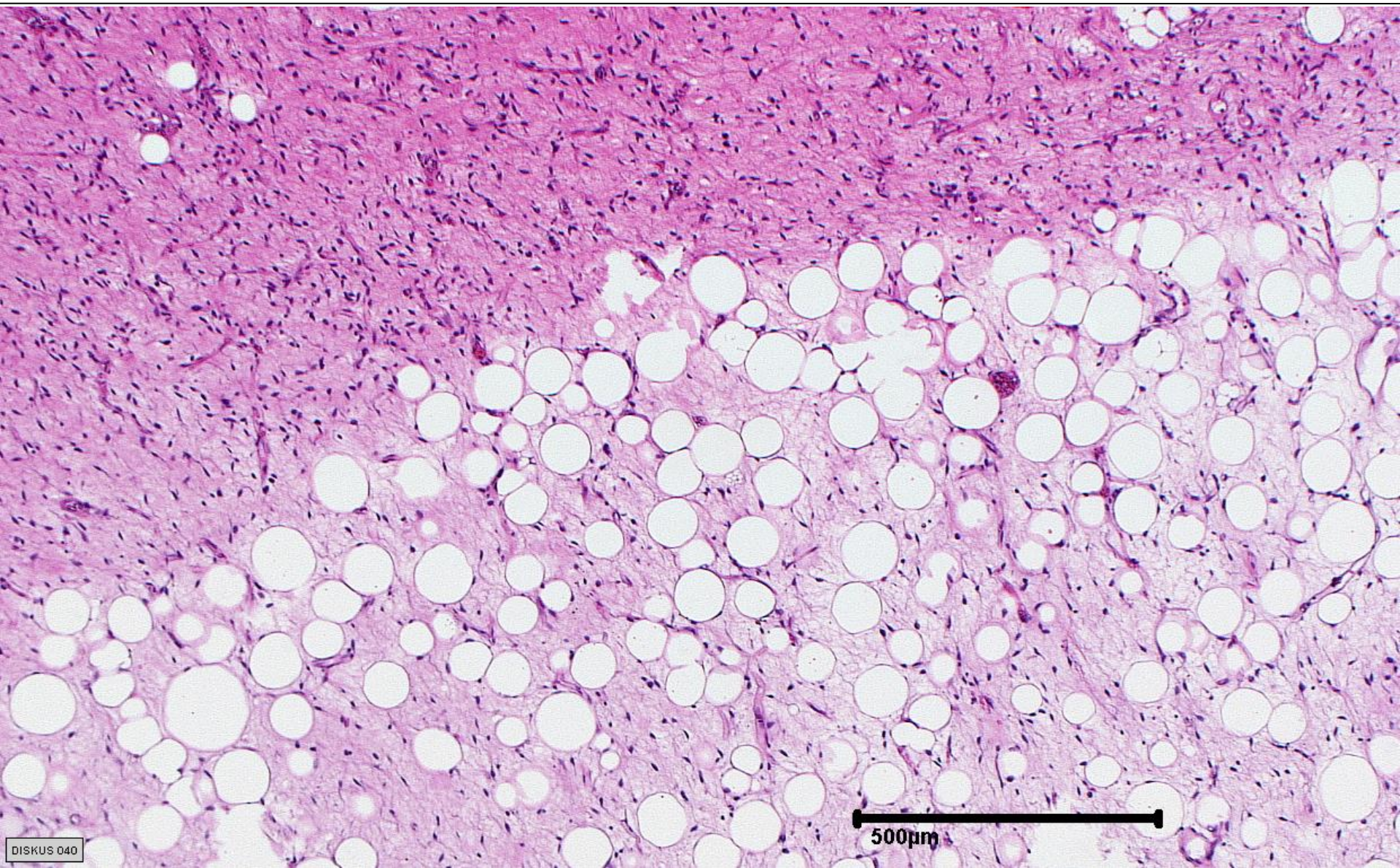

# „Liposarkom“

## Atypischer lipomatöser Tumor - ALT
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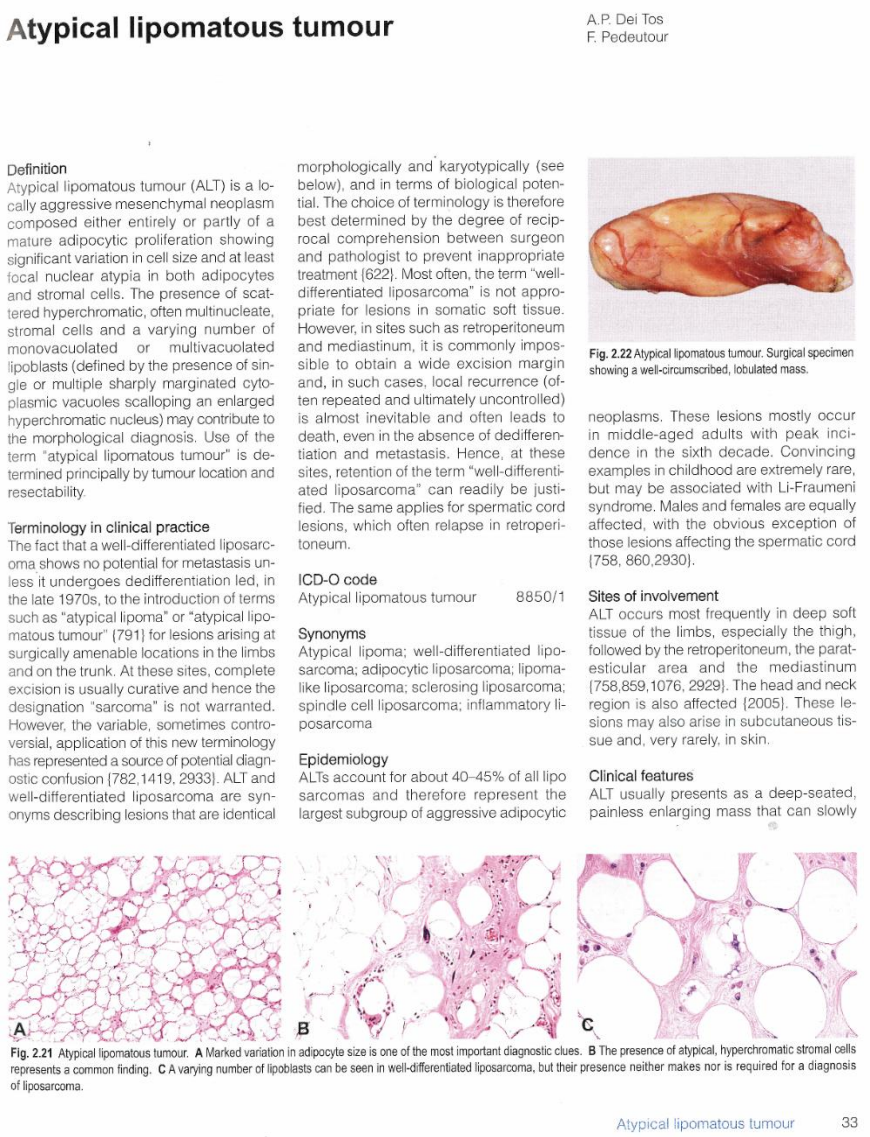


**Atypical lipomatous tumour**

A.P. Dei Tos
F. Pedeutour

**Definition**
Atypical lipomatous tumour (ALT) is a locally aggressive mesenchymal neoplasm composed either entirely or partly of a mature adipocytic proliferation showing significant variation in cell size and at least focal nuclear atypia in both adipocytes and stromal cells. The presence of scattered hyperchromatic, often multinucleate, stromal cells and a varying number of monovacuolated or multivacuolated lipoblasts (defined by the presence of single or multiple sharply marginated cytoplasmic vacuoles scalloping an enlarged hyperchromatic nucleus) may contribute to the morphological diagnosis. Use of the term "atypical lipomatous tumour" is determined principally by tumour location and resectability.

**Terminology in clinical practice**
The fact that a well-differentiated liposarcoma shows no potential for metastasis unless it undergoes dedifferentiation led, in the late 1970s, to the introduction of terms such as "atypical lipoma" or "atypical lipomatous tumour" {791} for lesions arising at surgically amenable locations in the limbs and on the trunk. At these sites, complete excision is usually curative and hence the designation "sarcoma" is not warranted. However, the variable, sometimes controversial, application of this new terminology has represented a source of potential diagnostic confusion {782,1419, 2933}. ALT and well-differentiated liposarcoma are synonyms describing lesions that are identical morphologically and karyotypically (see below), and in terms of biological potential. The choice of terminology is therefore best determined by the degree of reciprocal comprehension between surgeon and pathologist to prevent inappropriate treatment {622}. Most often, the term "well-differentiated liposarcoma" is not appropriate for lesions in somatic soft tissue. However, in sites such as retroperitoneum and mediastinum, it is commonly impossible to obtain a wide excision margin and, in such cases, local recurrence (often repeated and ultimately uncontrolled) is almost inevitable and often leads to death, even in the absence of dedifferentiation and metastasis. Hence, at these sites, retention of the term "well-differentiated liposarcoma" can readily be justified. The same applies for spermatic cord lesions, which often relapse in retroperitoneum.

**ICD-O code**
Atypical lipomatous tumour 8850/1

**Synonyms**
Atypical lipoma; well-differentiated liposarcoma; adipocytic liposarcoma; lipoma-like liposarcoma; sclerosing liposarcoma; spindle cell liposarcoma; inflammatory liposarcoma

**Epidemiology**
ALTs account for about 40–45% of all lipo sarcomas and therefore represent the largest subgroup of aggressive adipocytic neoplasms. These lesions mostly occur in middle-aged adults with peak incidence in the sixth decade. Convincing examples in childhood are extremely rare, but may be associated with Li-Fraumeni syndrome. Males and females are equally affected, with the obvious exception of those lesions affecting the spermatic cord {758, 860,2930}.



Fig. 2.22 Atypical lipomatous tumour. Surgical specimen showing a well-circumscribed, lobulated mass.

**Sites of involvement**
ALT occurs most frequently in deep soft tissue of the limbs, especially the thigh, followed by the retroperitoneum, the paratesticular area and the mediastinum {758,859,1076, 2929}. The head and neck region is also affected {2005}. These lesions may also arise in subcutaneous tissue and, very rarely, in skin.

**Clinical features**
ALT usually presents as a deep-seated, painless enlarging mass that can slowly




Fig. 2.21 Atypical lipomatous tumour. **A** Marked variation in adipocyte size is one of the most important diagnostic clues. **B** The presence of atypical, hyperchromatic stromal cells represents a common finding. **C** A varying number of lipoblasts can be seen in well-differentiated liposarcoma, but their presence neither makes nor is required for a diagnosis of liposarcoma.



Keine Metastasen (wenn nicht dedifferenziert)

Terminologie anhand der Tumorlokalisation und Resektabilität:
Klassische Extremitätenlokalisation ist für gewöhnlich resektabel und hat einen guten Verlauf / Prognose → ALT

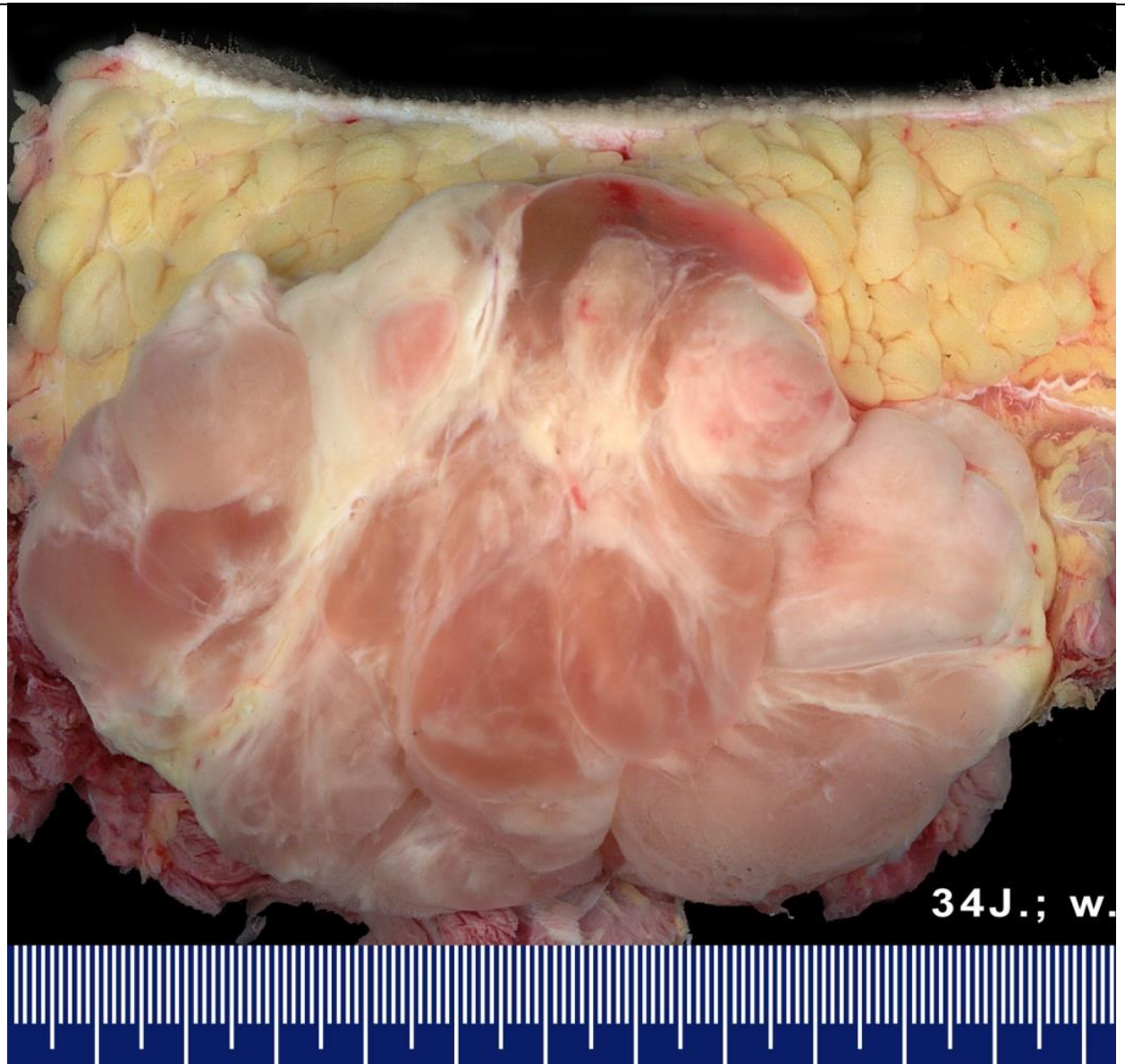
Retroperitoneum / Samenstrang / Mediastinum ist die Resektabilität eingeschränkt, der Eingriff unwesentlich größer für den Patienten und führt häufig zum Tode, auch ohne Dedifferenzierung / Metastasen, sodass hier der Begriff „gut differenziertes Liposarkom“ gerechtfertigt erscheint.

Aber

8850/1

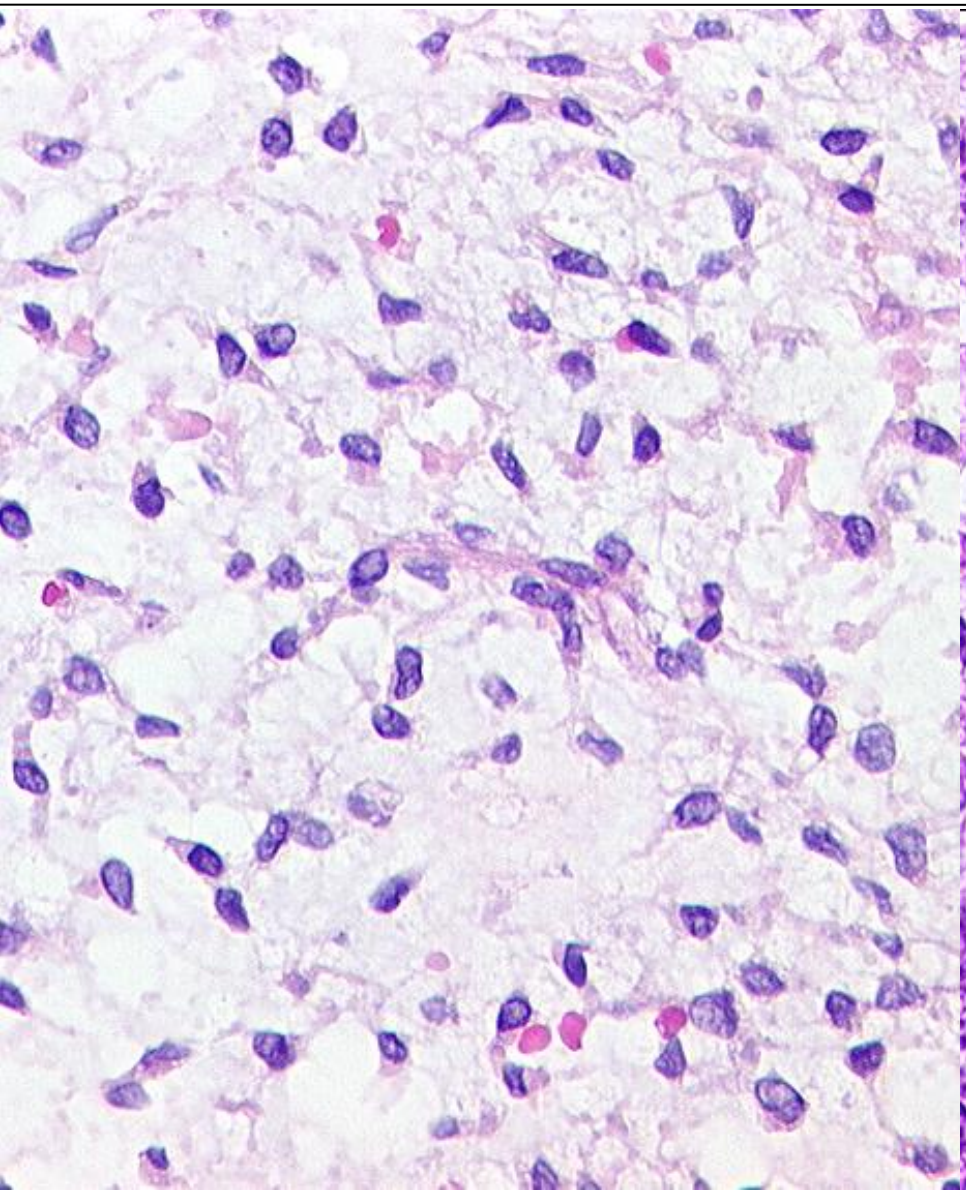
# Liposarkom

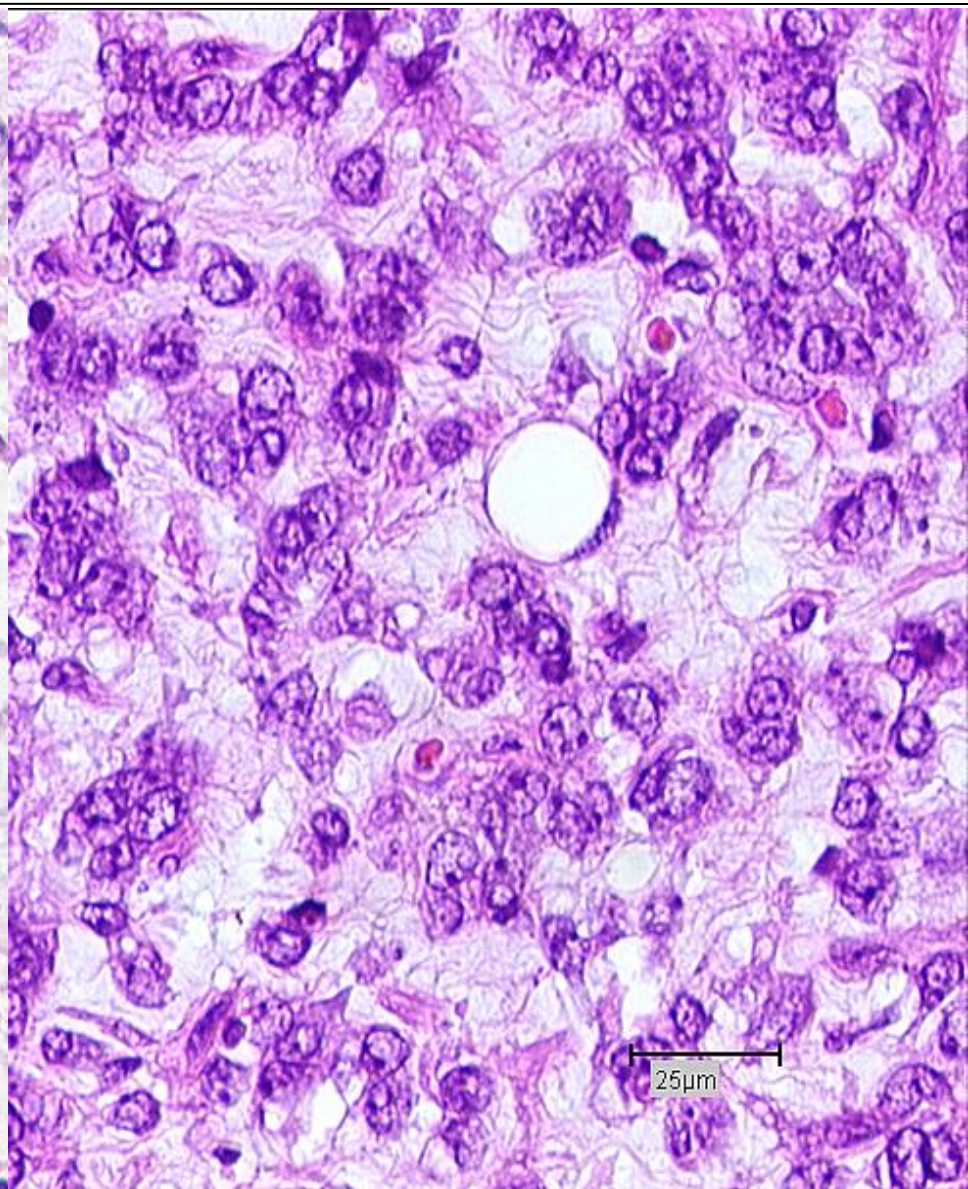
Myxoides / Rundzelliges Liposarkom



# Liposarkom

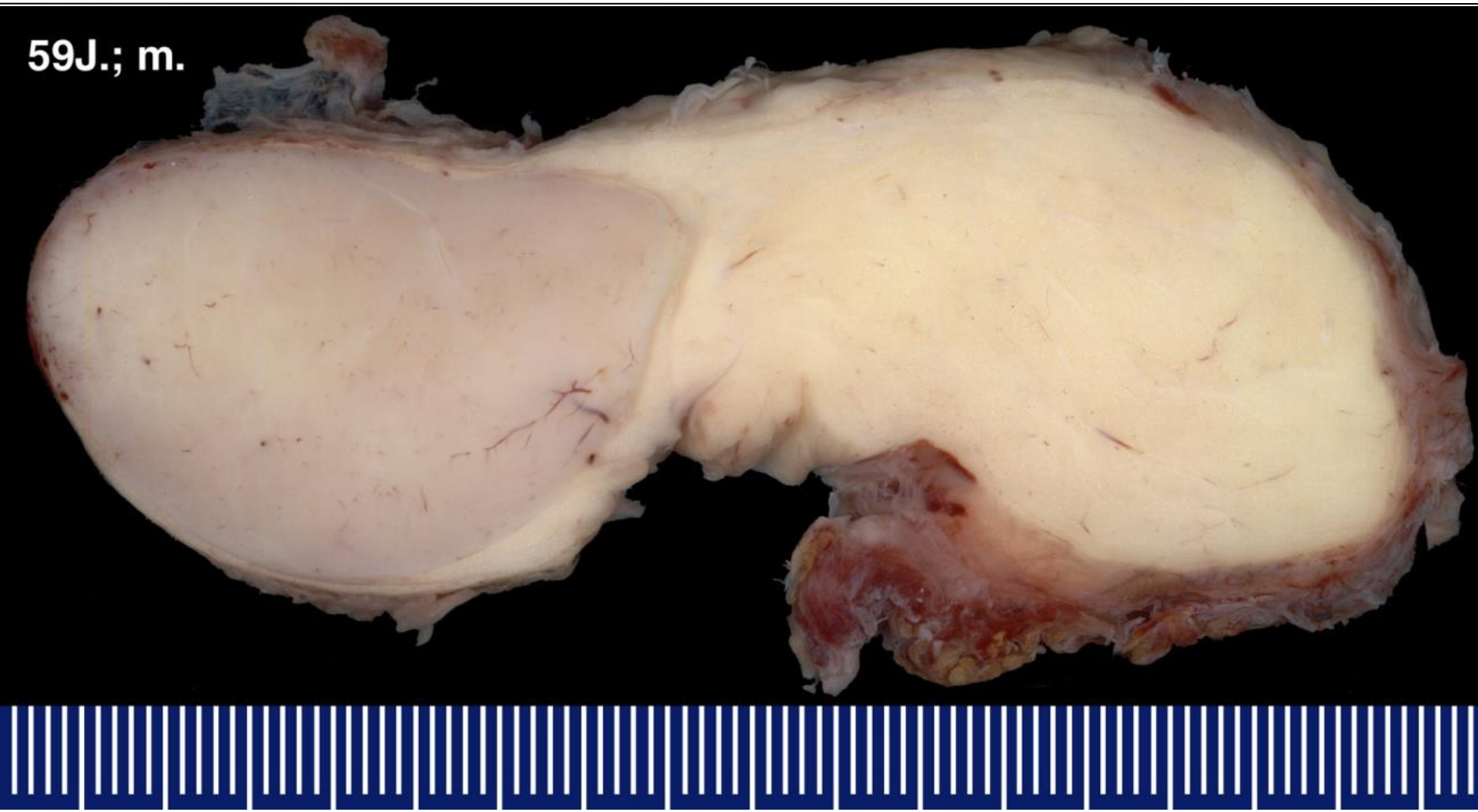
Myxoides / Rundzelliges Liposarkom





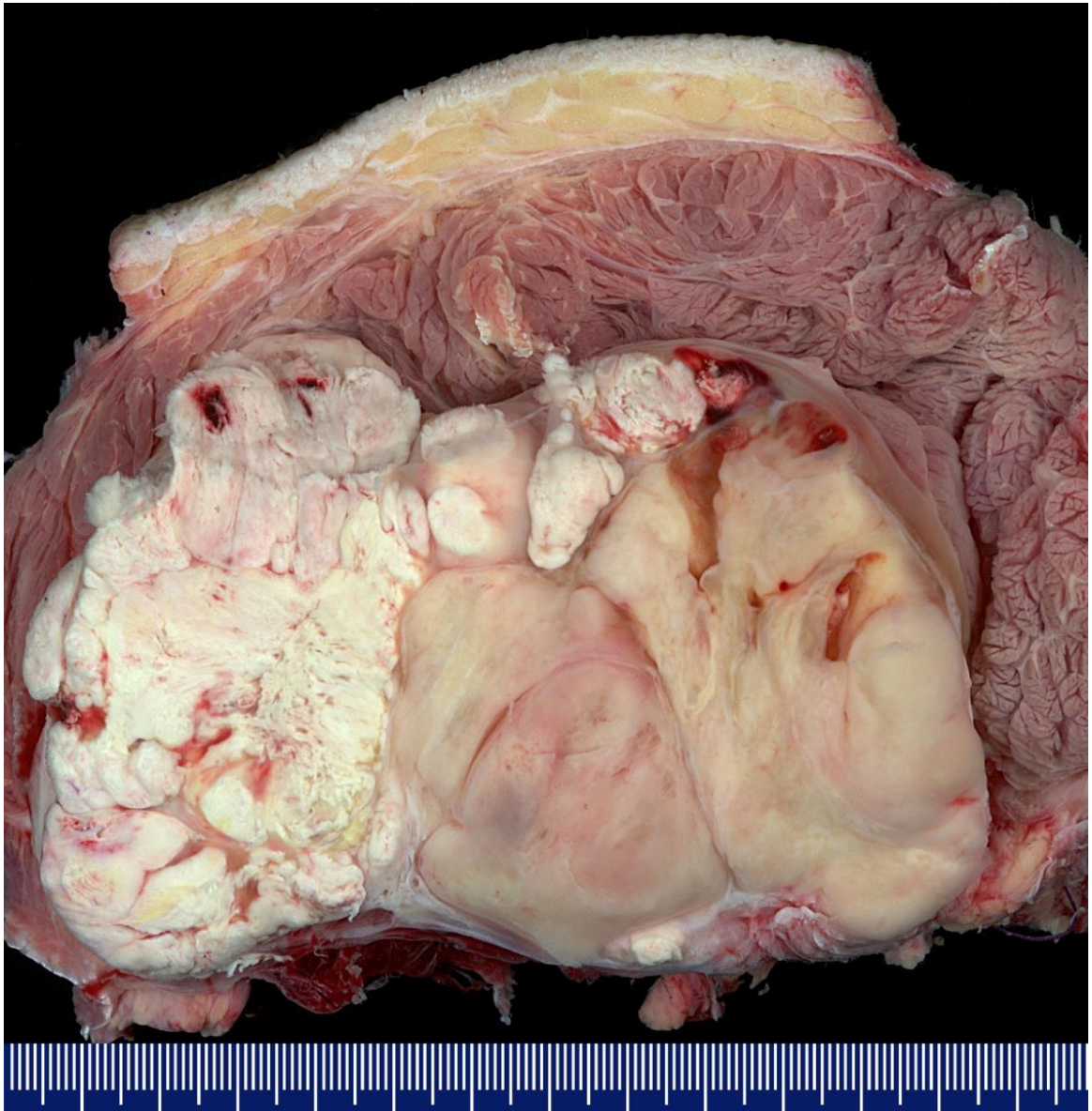
# Liposarkom

Dedifferenziertes Liposarkom



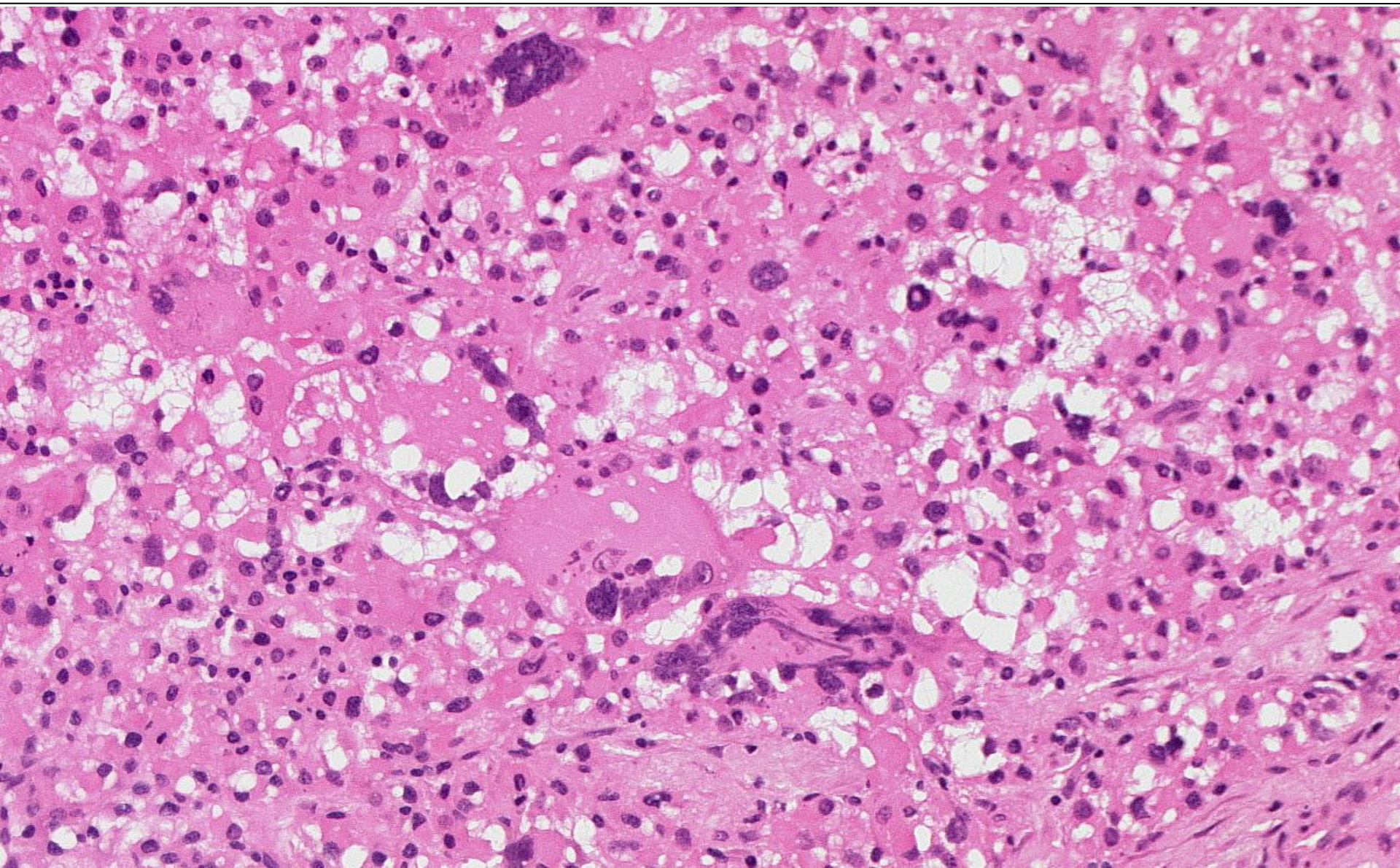
# Liposarkom

Pleomorphes Liposarkom



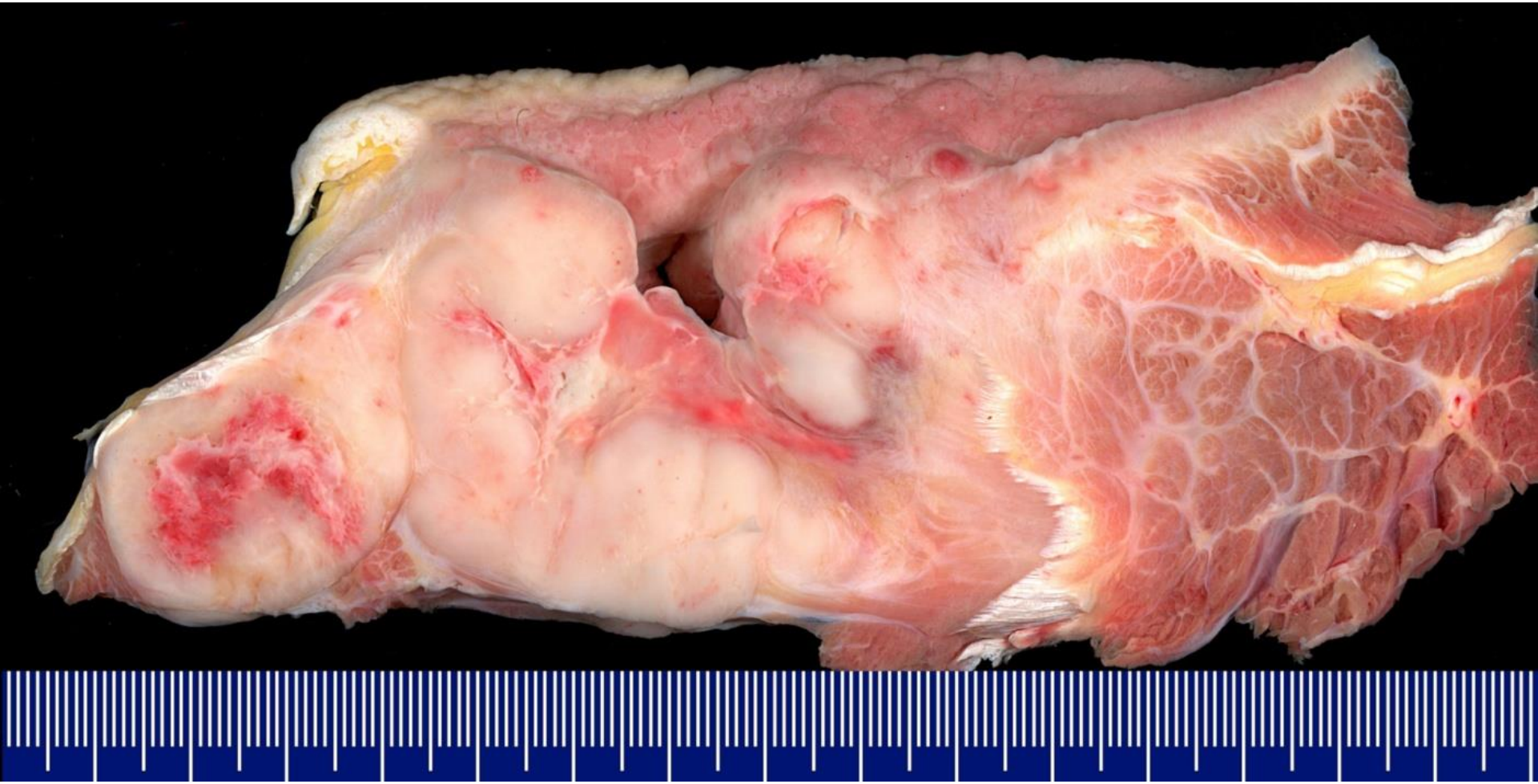
# Liposarkom

Pleomorphes Liposarkom



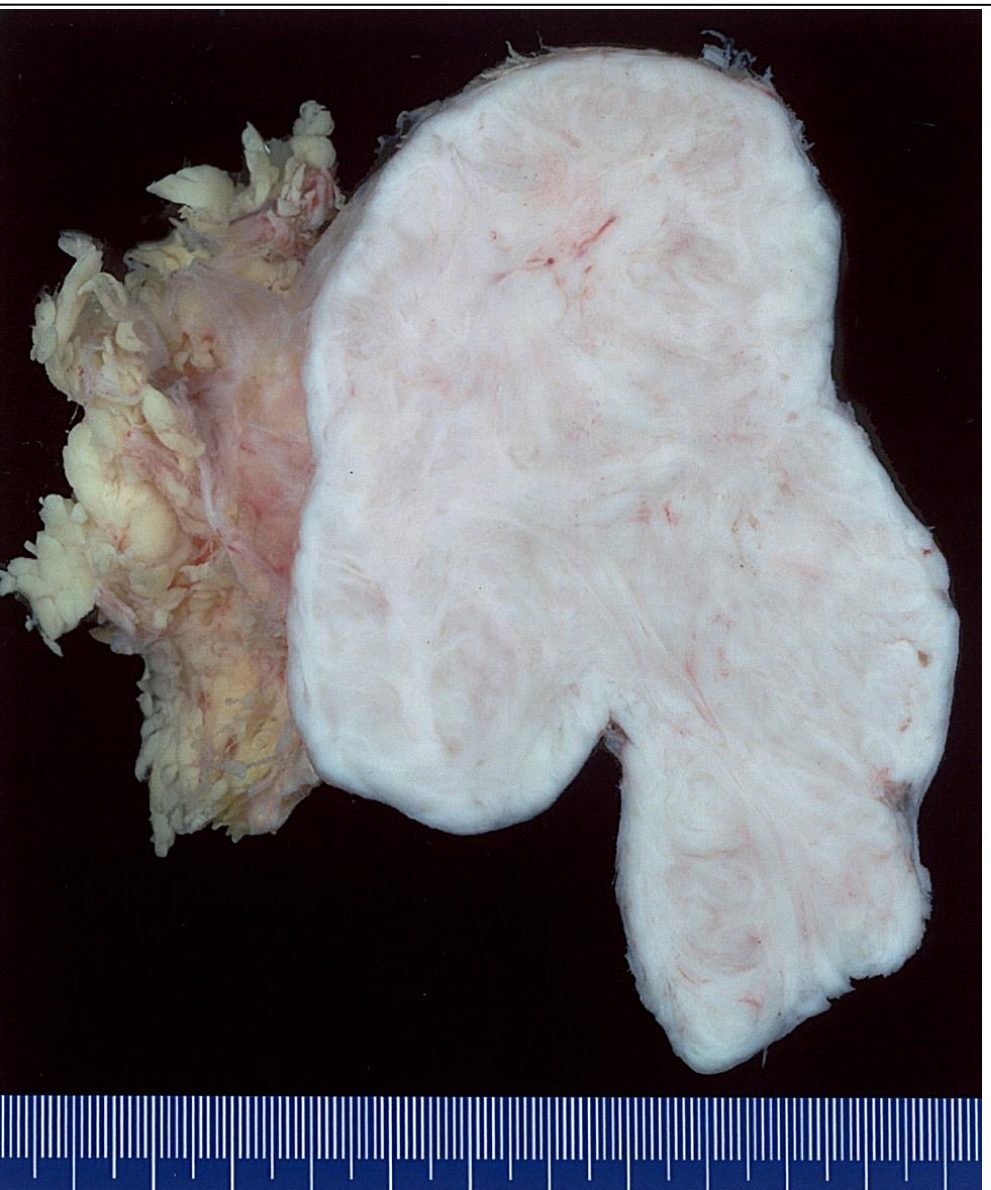
# Leiomyosarkom

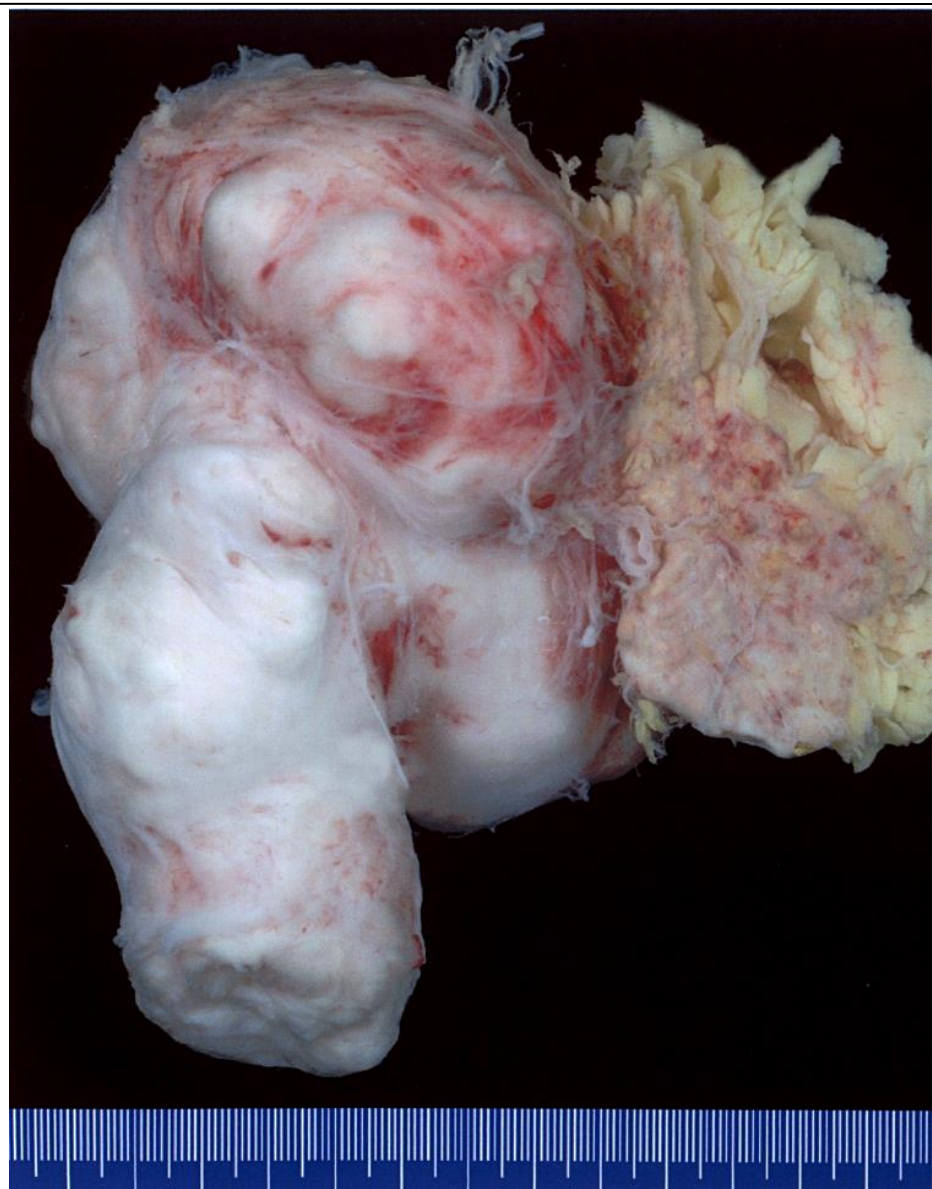
Makroskopie



# Leiomyosarkom

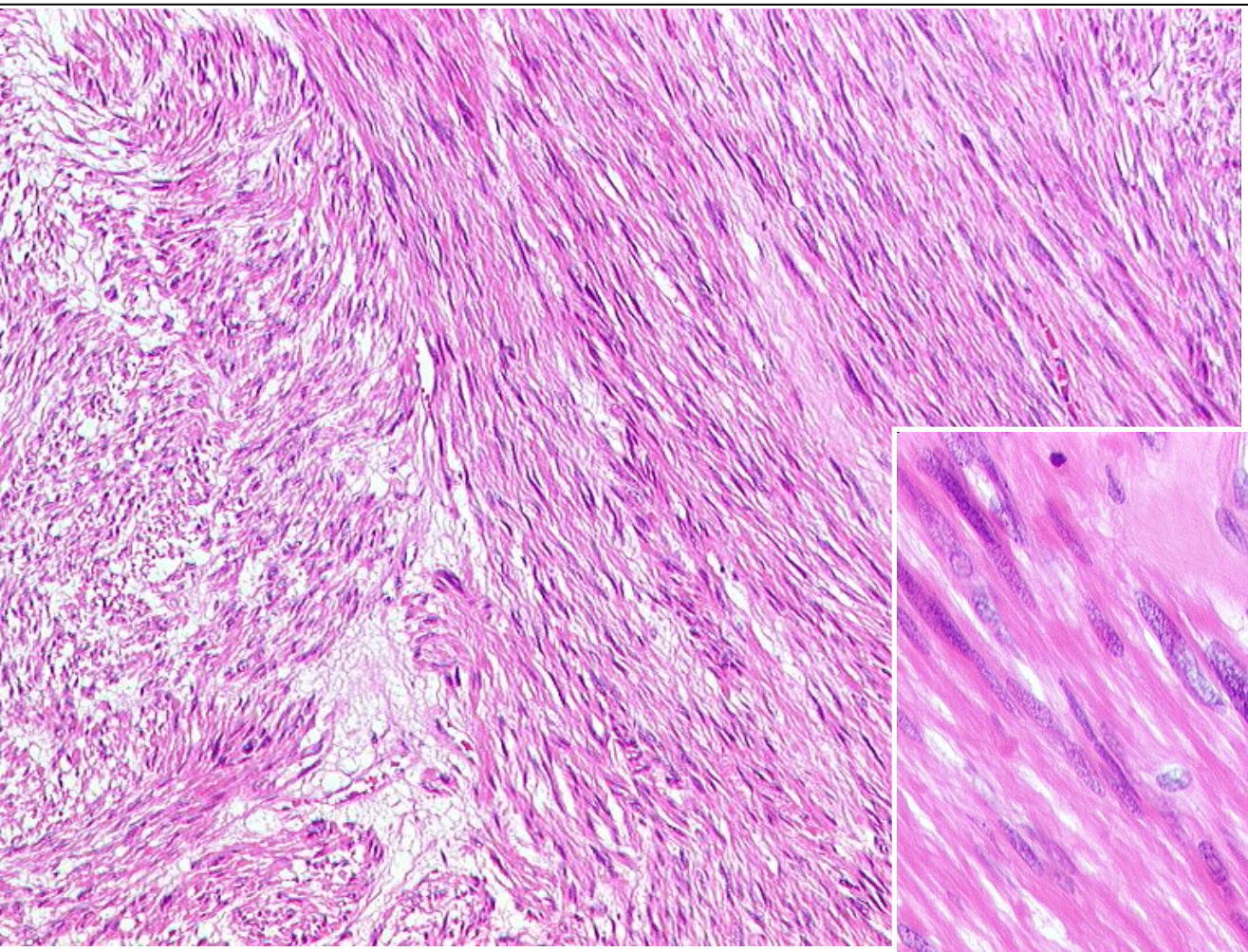
Makroskopie - Sonderform vaskuläres Leiomyosarkom - Vena cava inferior

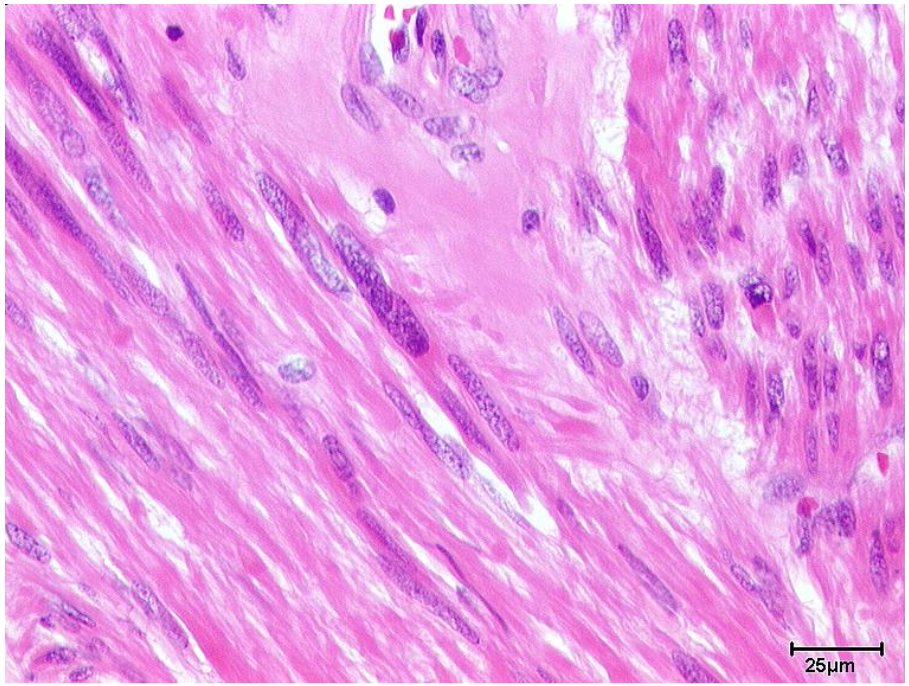




# Leiomyosarkom

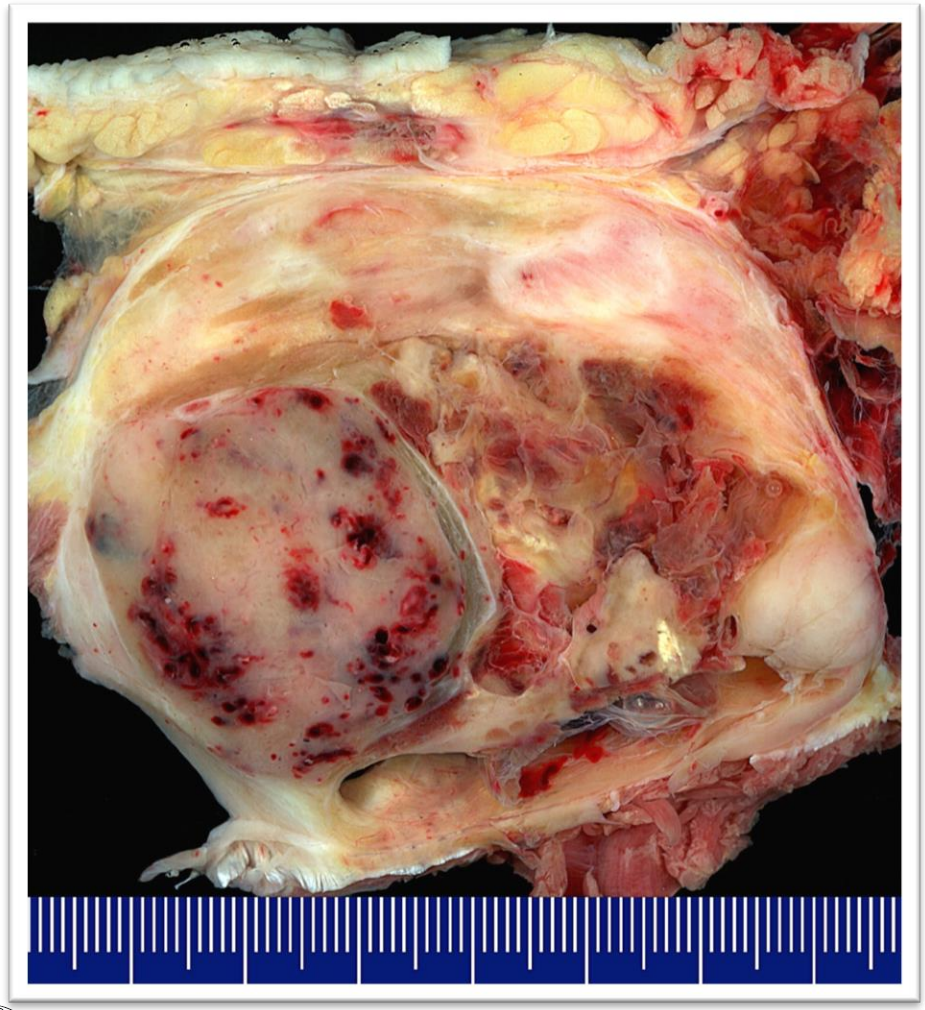
Mikroskopie

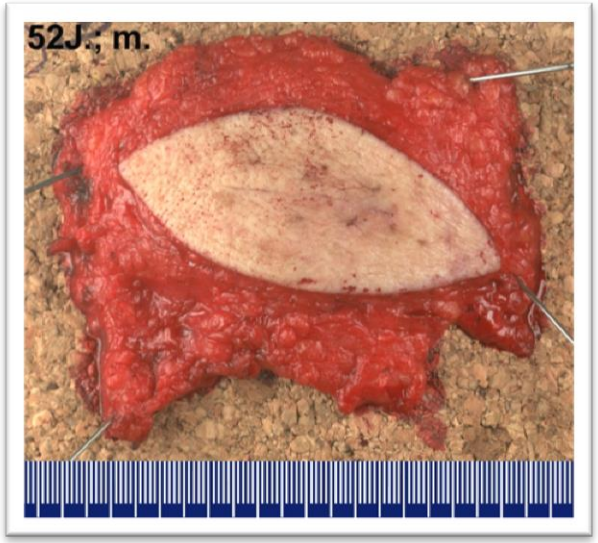




# Undifferenziertes pleomorphes Sarkom

## Sarkom früher MFH





# Undifferenziertes pleomorphes Sarkom

**MFH: Malignes Fibröses Histiozytom**

**= Pleomorphes Sarkom NOS**
**(Not Otherwise Specified), sog. MFH**

- (Noch) Häufigstes Sarkom im Erwachsenenalter (ca. 20%)

- Höheres Lebensalter: 6., 7. Lebensdekade

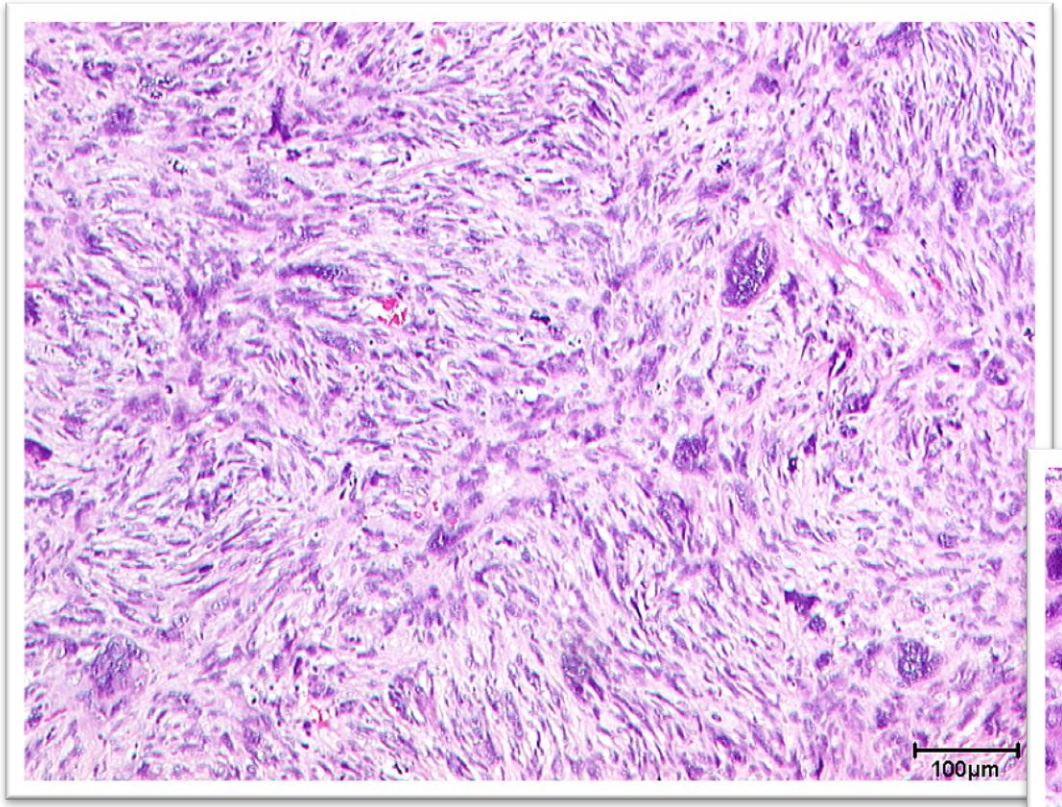
- Histologie: Storiforme („bastmattenartige“) und pleomorphe Anteile

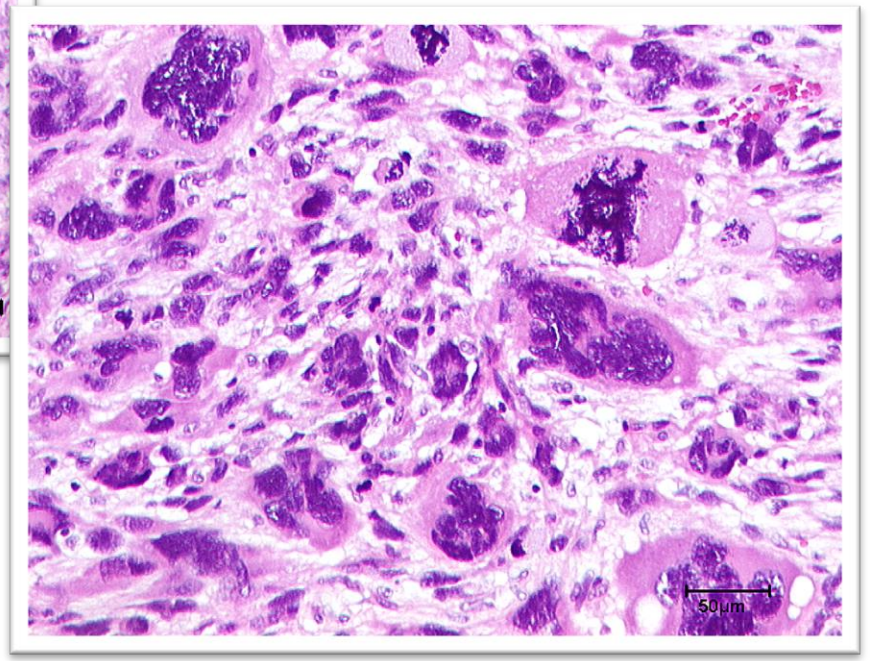
# Undifferenziertes pleomorphes Sarkom

**MFH**
Prototyp eines undifferenzierten pleomorphen Sarkoms.
***Keine histiozytäre**, sondern undifferenzierte mesenchymale (fibroblastische) Differenzierung!*

**⇒ „Sarkom NOS (Not Otherwise Specified), sog. MFH“**

# Undifferenziertes pleomorphes Sarkom




**Storiform-pleomorphes Sarkom**

# Undifferentiated/unclassified sarcomas

C.D.M. Fletcher
F. Chibon
F. Mertens

## Definition

A soft tissue sarcoma showing no identifiable line of differentiation when analysed by presently available technology. At present, this is a heterogeneous group and a diagnosis of exclusion, although genetic subgroups are emerging. Not included are dedifferentiated types of specific soft tissue sarcoma, in which the dedifferentiated component is commonly undifferentiated.

## ICD-O codes

| | |
|---|---|
| Undifferentiated round cell sarcoma | 8803/3 |
| Undifferentiated spindle cell sarcoma | 8801/3 |
| Undifferentiated pleomorphic sarcoma | 8802/3 |
| Undifferentiated epithelioid sarcoma | 8804/3 |
| Undifferentiated sarcoma, not otherwise specified | 8805/3 |

## Epidemiology

Undifferentiated soft tissue sarcomas (USTS) are uncommon mesenchymal neoplasms that are anatomically ubiquitous and occur at all ages with no difference between the sexes. USTS account for up to 20% of all soft tissue sarcomas. Those with round cell morphology are most frequent in young patients and may ultimately prove to be specific entities; those that are pleomorphic (often known as pleomorphic malignant fibrous histiocytoma in the past) occur mostly in older adults.

## Etiology

The etiology of most USTS is unknown. However, at least 25% of radiation-associated soft tissue sarcomas are undifferentiated {987,1555}.

## Sites of involvement

USTS may be found at any location. Published data are limited but, overall, it seems that these lesions are most common in somatic soft tissue.

## Clinical features

USTS has no characteristic clinical features that would distinguish it from other types of sarcoma, other than a frequently rapid growth rate.

## Macroscopy

USTSs are a heterogenous group and thus have no distinctive macroscopic features, other than the frequent presence of necrosis.

## Histopathology

USTS may be broadly divided into pleomorphic, spindle cell, round cell and epithelioid subsets, but none have specific defining features other than their lack of an identifiable line of differentiation {861}. Pleomorphic USTS closely resembles other specific types of pleomorphic sarcoma and is often patternless, with frequent bizarre multinucleate tumour giant cells. Spindle cell USTS most often shows a fascicular architecture with variably amphophilic or palely eosinophilic cytoplasm and tapering nuclei. Round cell USTS consist of relatively uniform rounded or ovoid cells with a high nuclear to cytoplasmic ratio and most often closely resembles other specific types of round cell sarcoma, especially Ewing sarcoma. USTS with epithelioid morphology has been little studied as yet {2421}, but is probably not rare. Morphologically these lesions closely resemble metastatic carcinoma or melanoma, but generally lack nesting and have amphophilic or palely eosinophilic cytoplasm and large vesicular nuclei. Importantly, genomic profiling may reveal that some seemingly undifferentiated sarcomas can be classified more specifically {379,496,498,1904}.

## Immunophenotype

As defined, USTS shows no reproducible immunophenotype, nor any pattern of protein expression that would allow more specific subclassification. However, USTS may often show small numbers of cells that may express keratin, actin, desmin or EMA and there may be patchy positivity for CD99 in round cell neoplasms. Vimentin and CD34 may be positive, but have no discriminatory value.

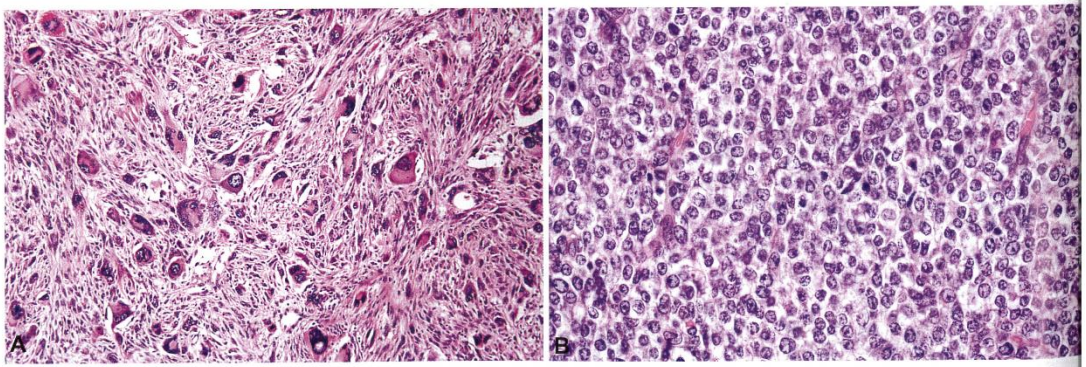


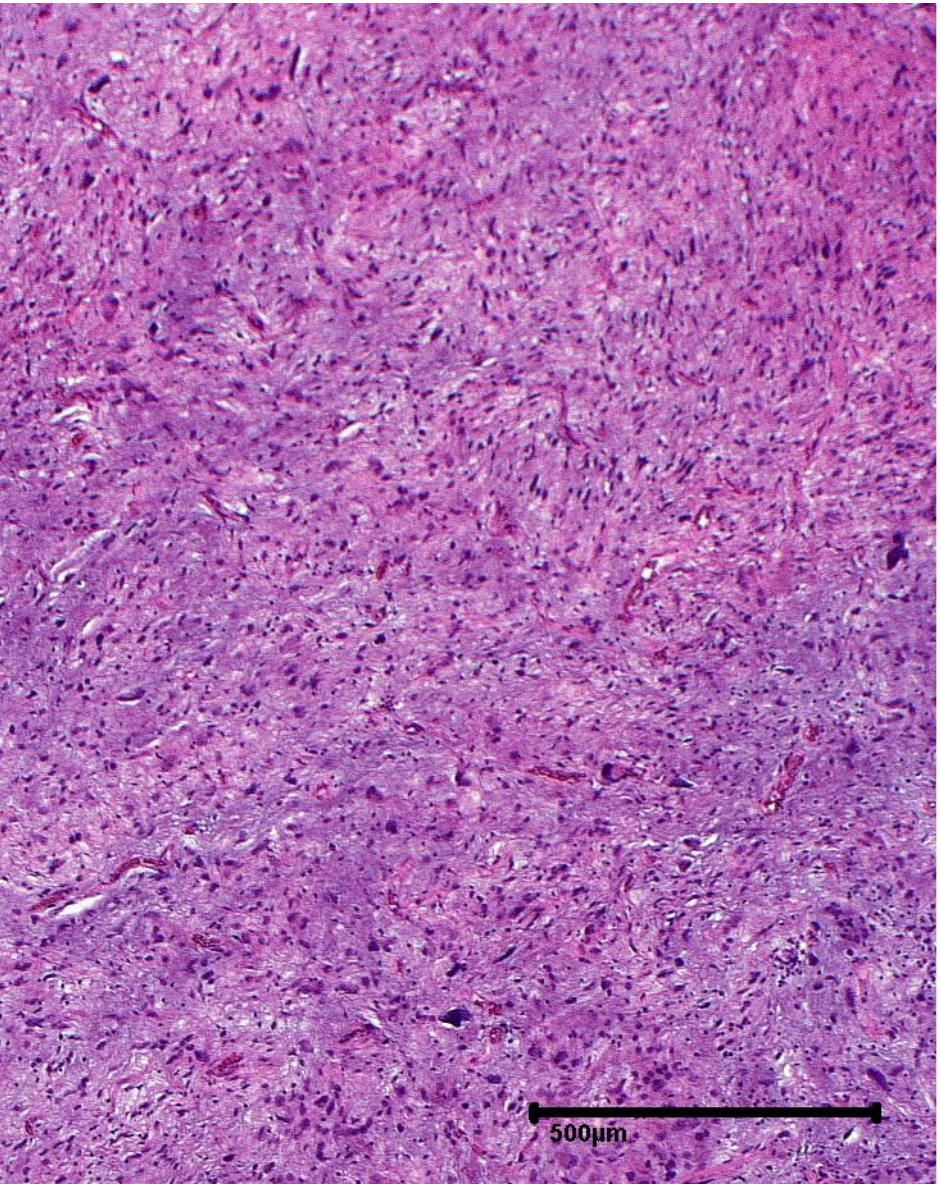

**Fig. 13.1** Undifferentiated sarcoma. **A** Pleomorphic morphology. **B** Round cell morphology.

# Differentialdiagnostik

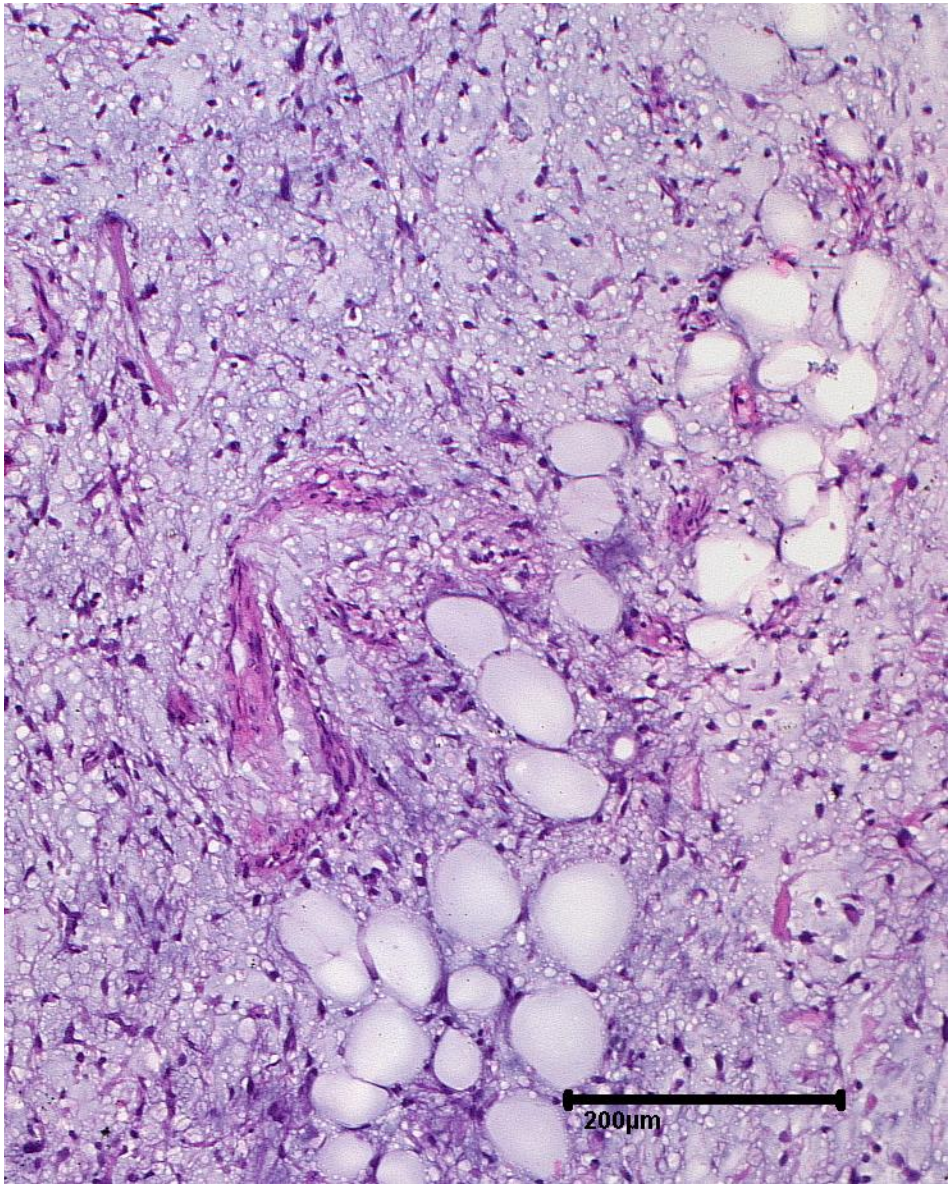
Welche Möglichkeiten der Diagnostik gibt es über die konventionelle Histologie hinaus?

# Differentialdiagnose - Myxoides Sarkom

Myxofibrosarkom

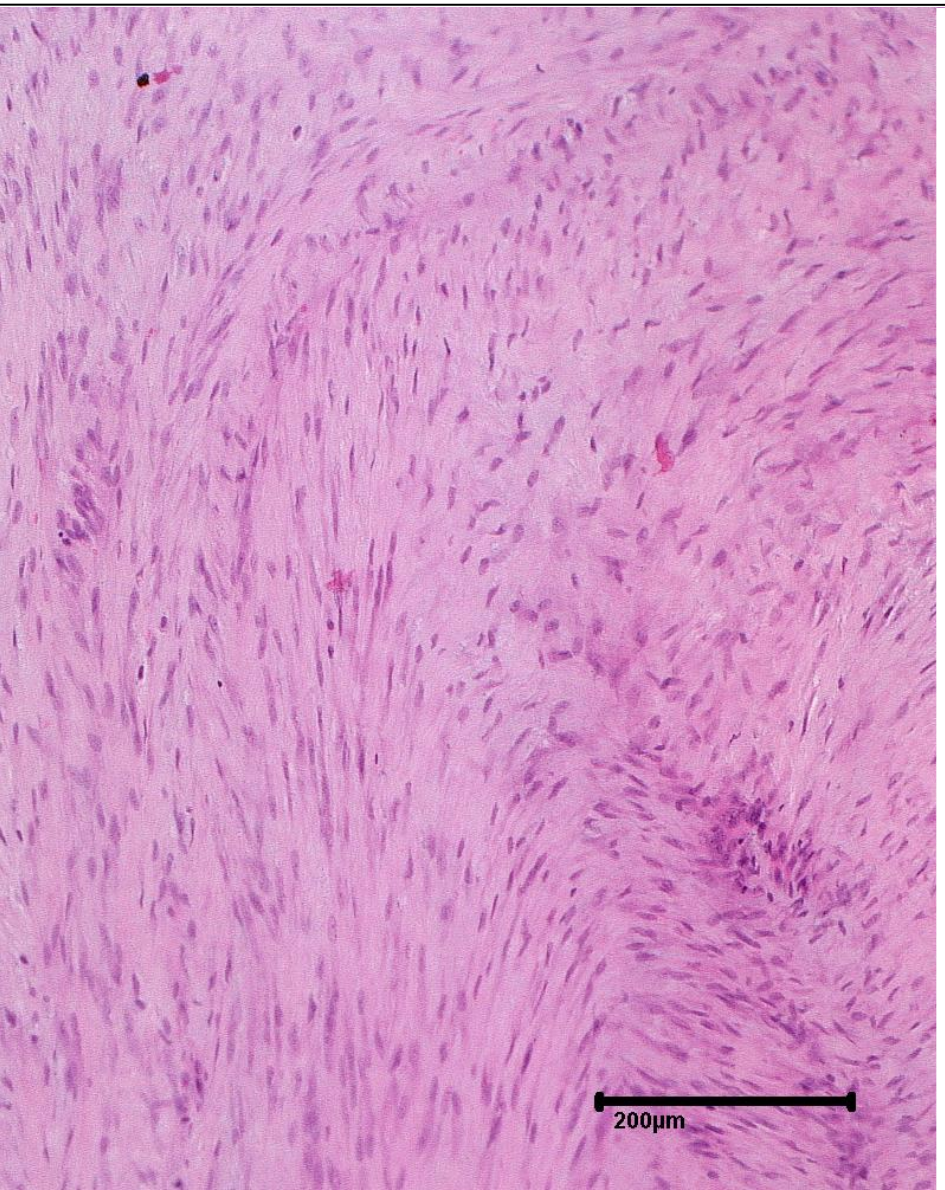



Myxoides Liposarkom

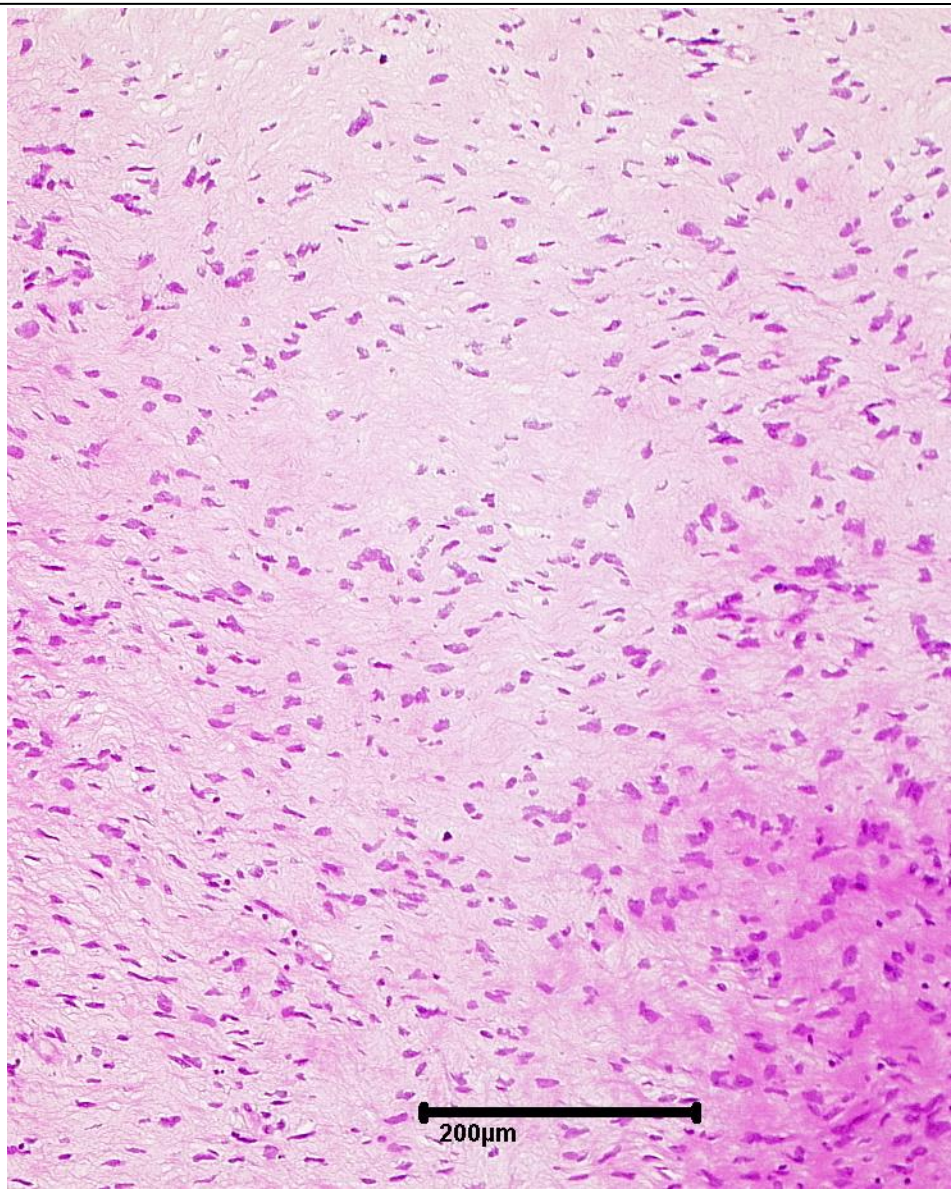


# Differentialdiagnose - Spindelzelliger Tumor

Aggressive Fibromatose




(Myo-) fibroblastisches Sarkom



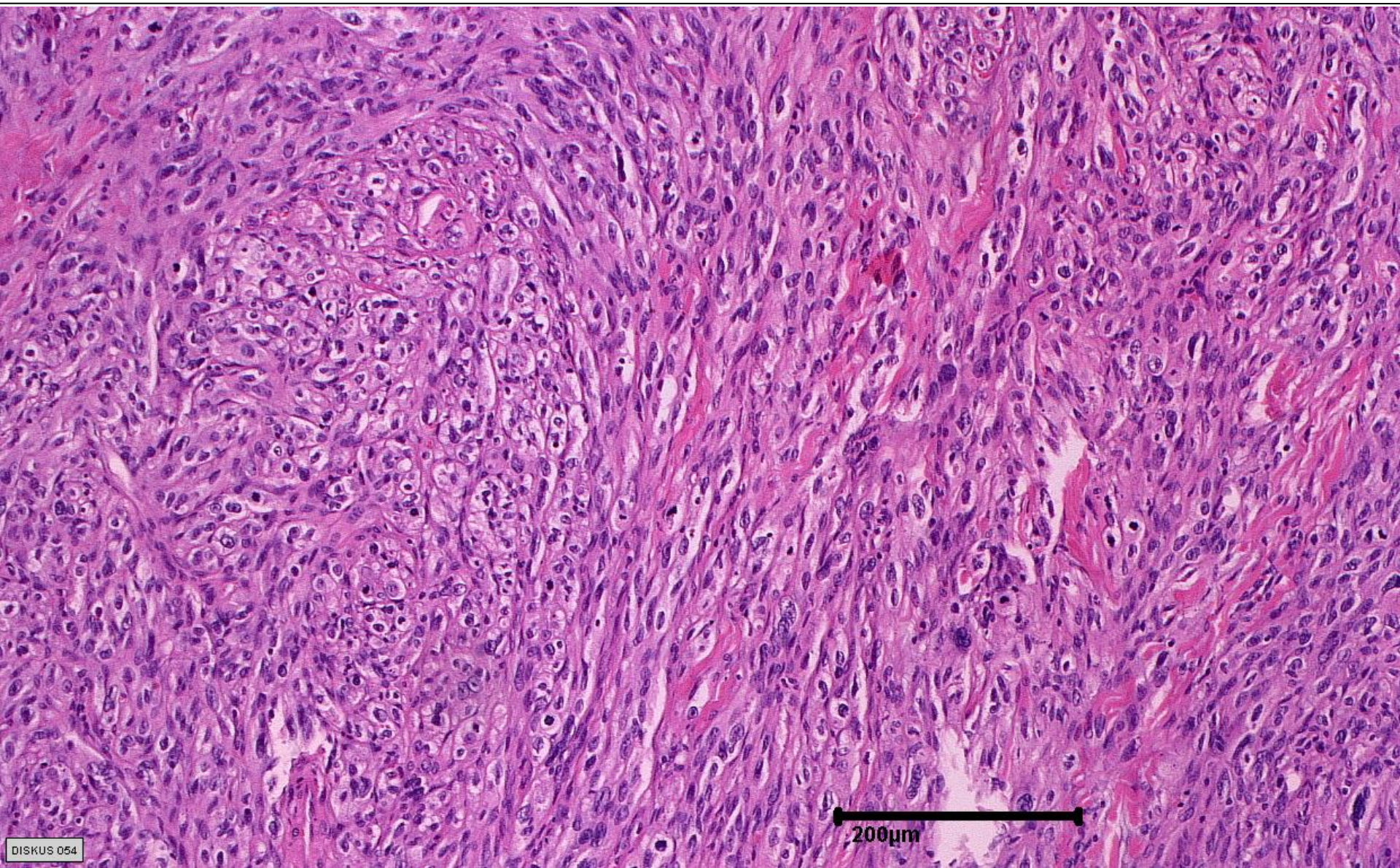
# Immunhistochemie

Ausgewählte Antikörper

| Antikörper | exprimiert bei folgenden Tumoren |
|---|---|
| Zytokeratine | Karzinome, Epitheloide Sarkome, Synoviale Sarkome, MPNST |
| Desmin | Tumoren der glatten Muskulatur und Skelettmuskel (benigne+maligne) |
| glattes Aktin | glattmuskuläre / myofibroblastische Tumoren (benigne+maligne) |
| S100 | Melanom, MPNST, Chondrogene Tumoren, Fettgewebstumoren |
| CD34 | vaskuläre Tumoren, SFT, DFSP |
| CD99 | Ewing Sarkom / PNET, Synoviale Sarkome, einige Osteosarkome |
| MDM2/CDK4 | Atypische Lipomatöse Tumoren und dedifferenzierte Liposarkome |
| bcl-2 | Synoviale Sarkome, SFT, andere Spindelzelltumoren |

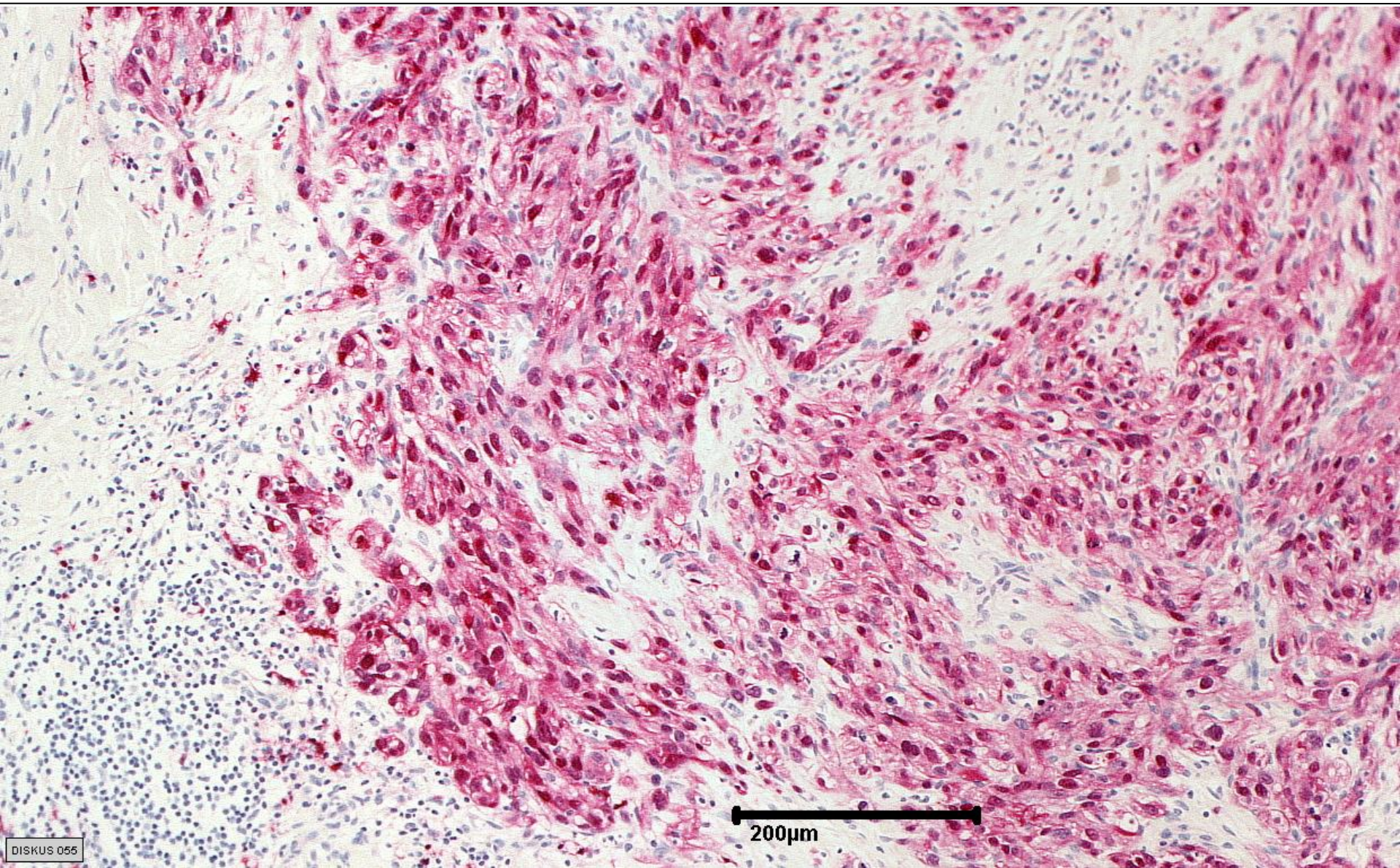
# MPNST

HE / konventionelle Histologie



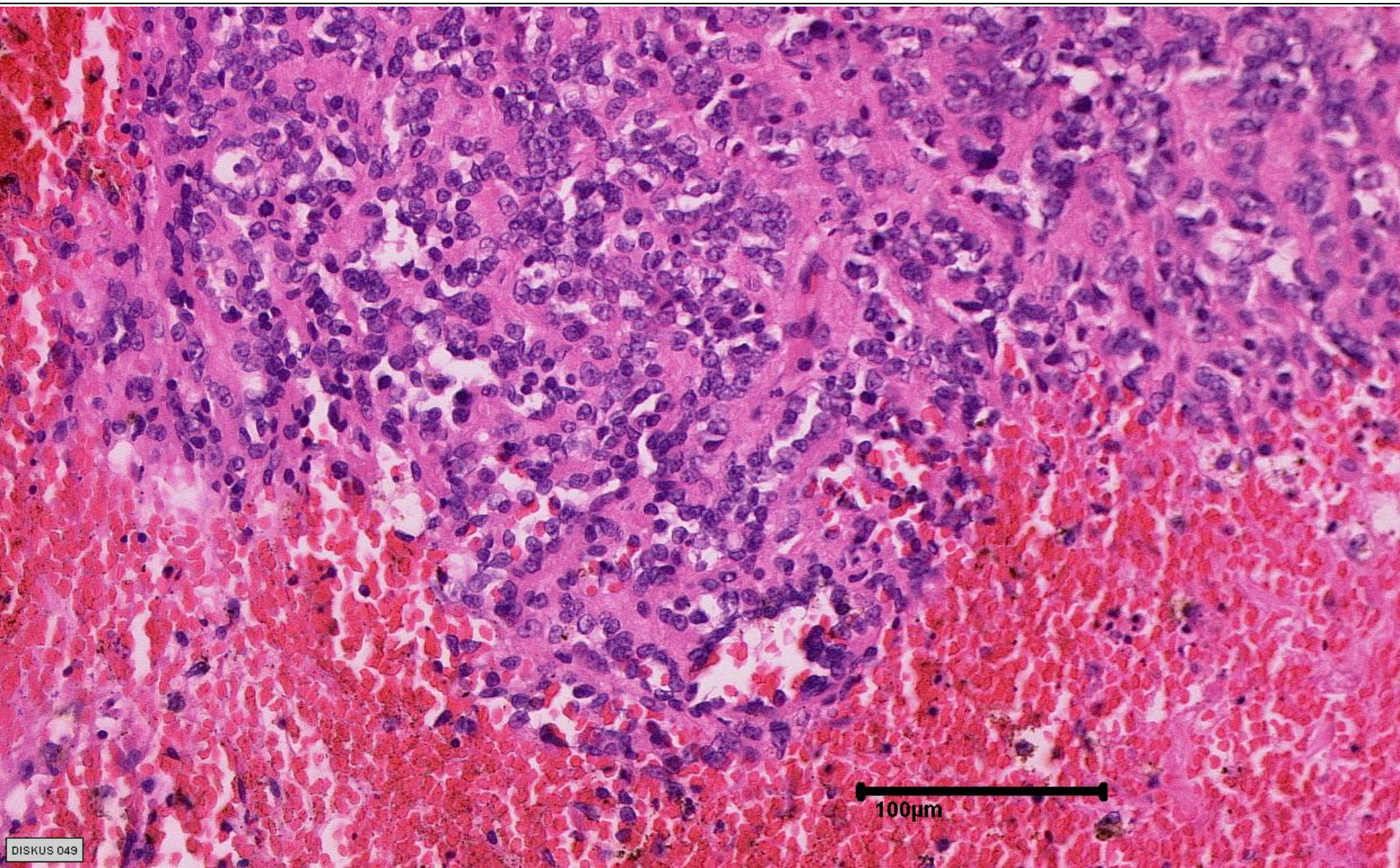
# MPNST

Immunhistochemie S100



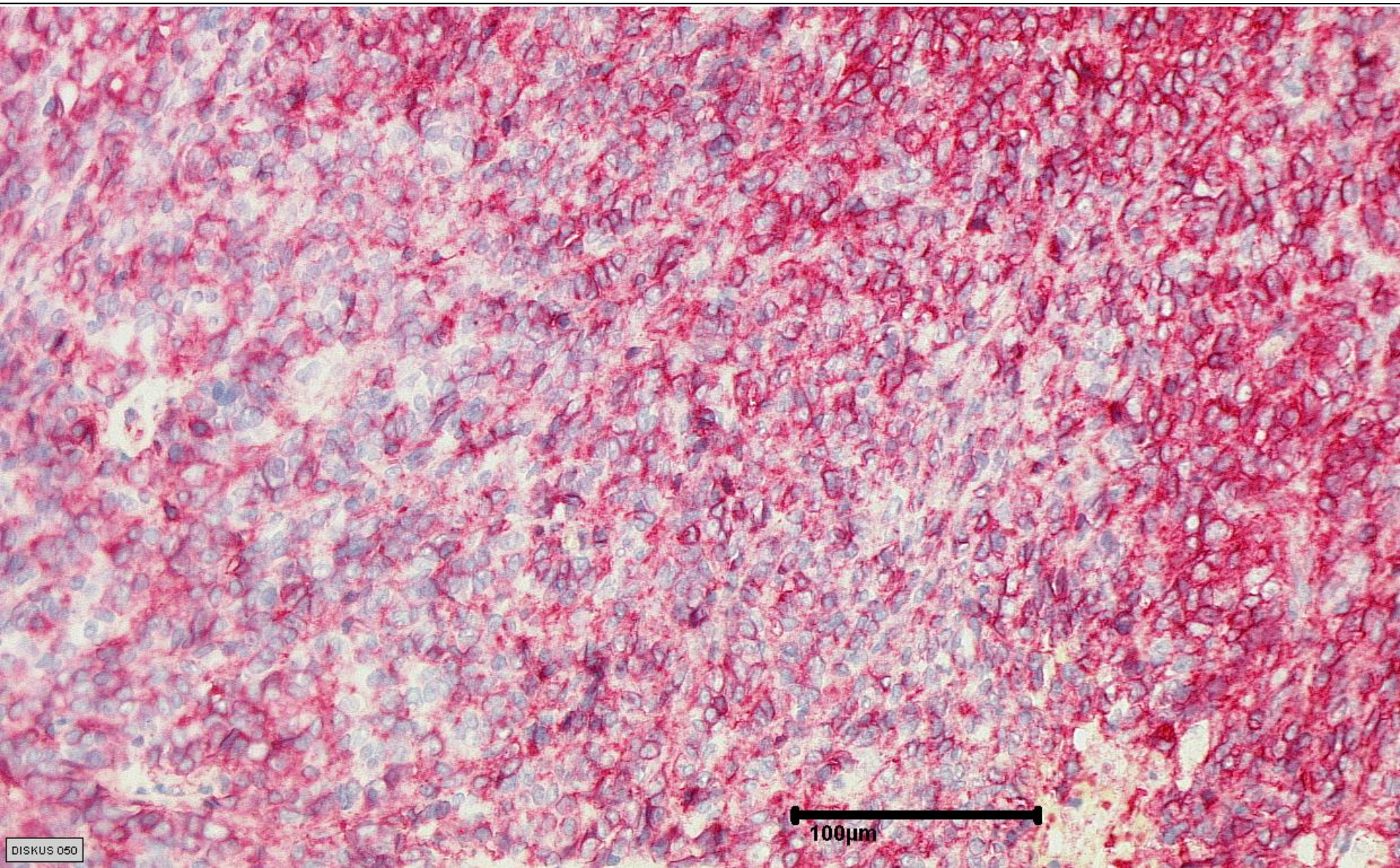
# Angiosarkom

Konventionelle Histologie (HE)



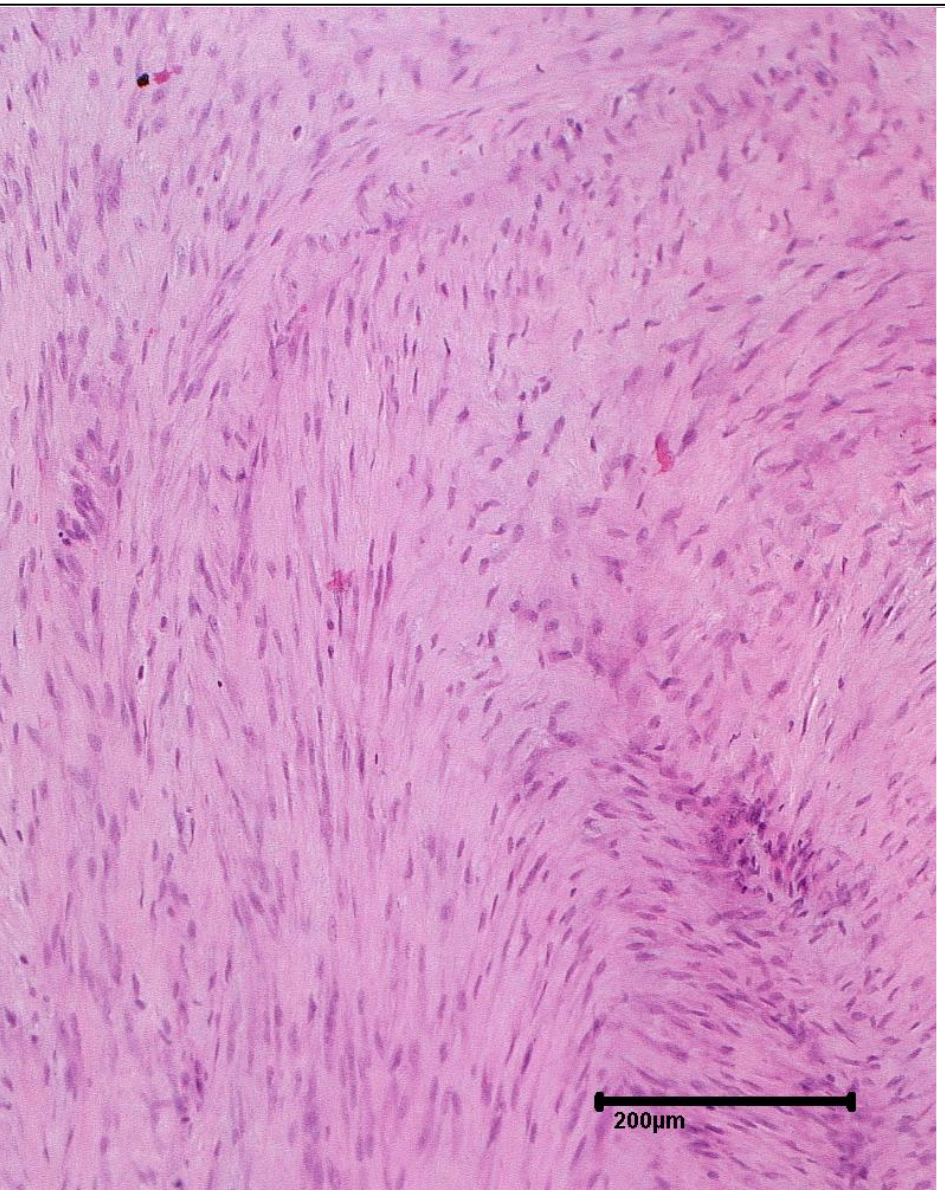
# Angiosarkom

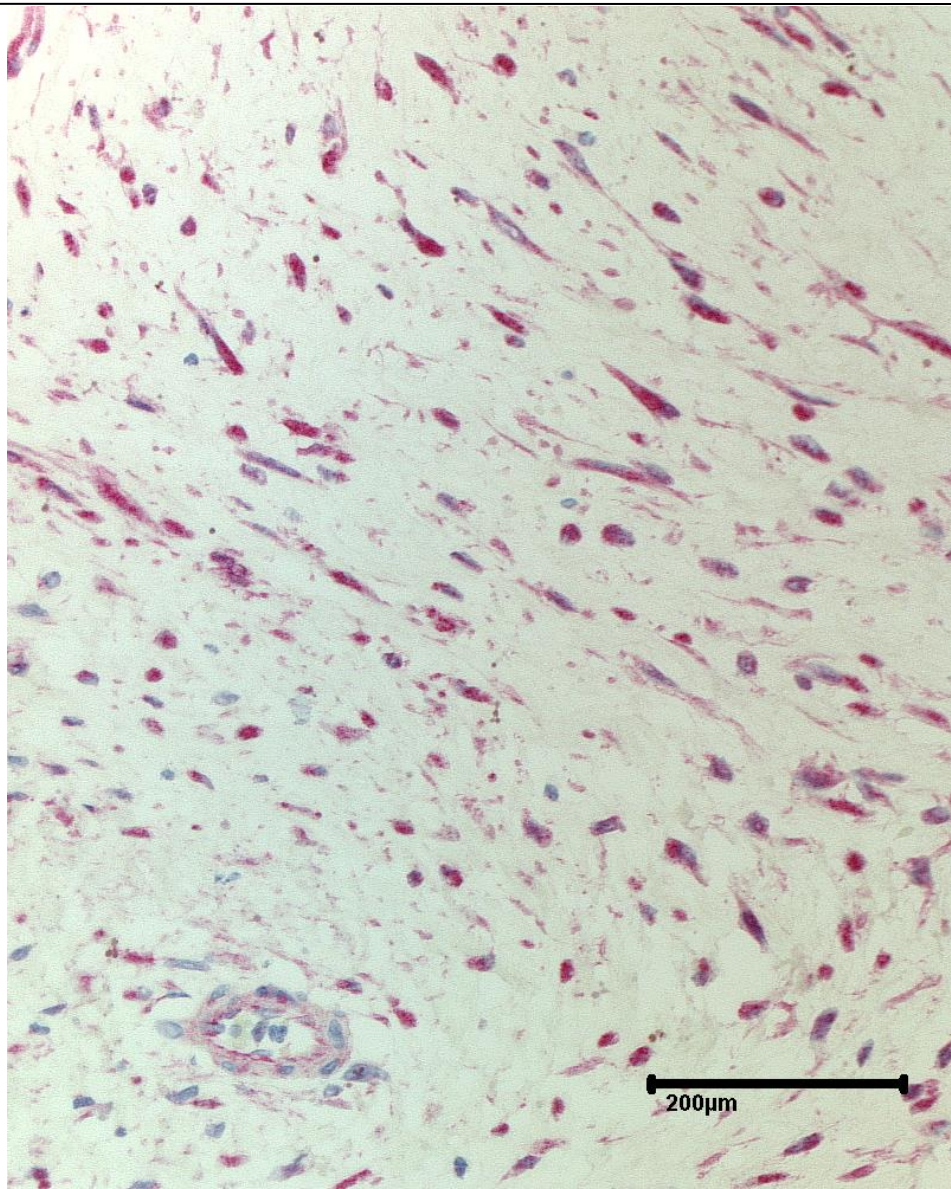
Immunhistochemie CD31



# Aggressive Fibromatose / Immunhistochemie

Nukleär positive Reaktion: Beta Catenin



# Aggressive Fibromatose / Desmoidfibromatose

Makroskopischer Aspekt

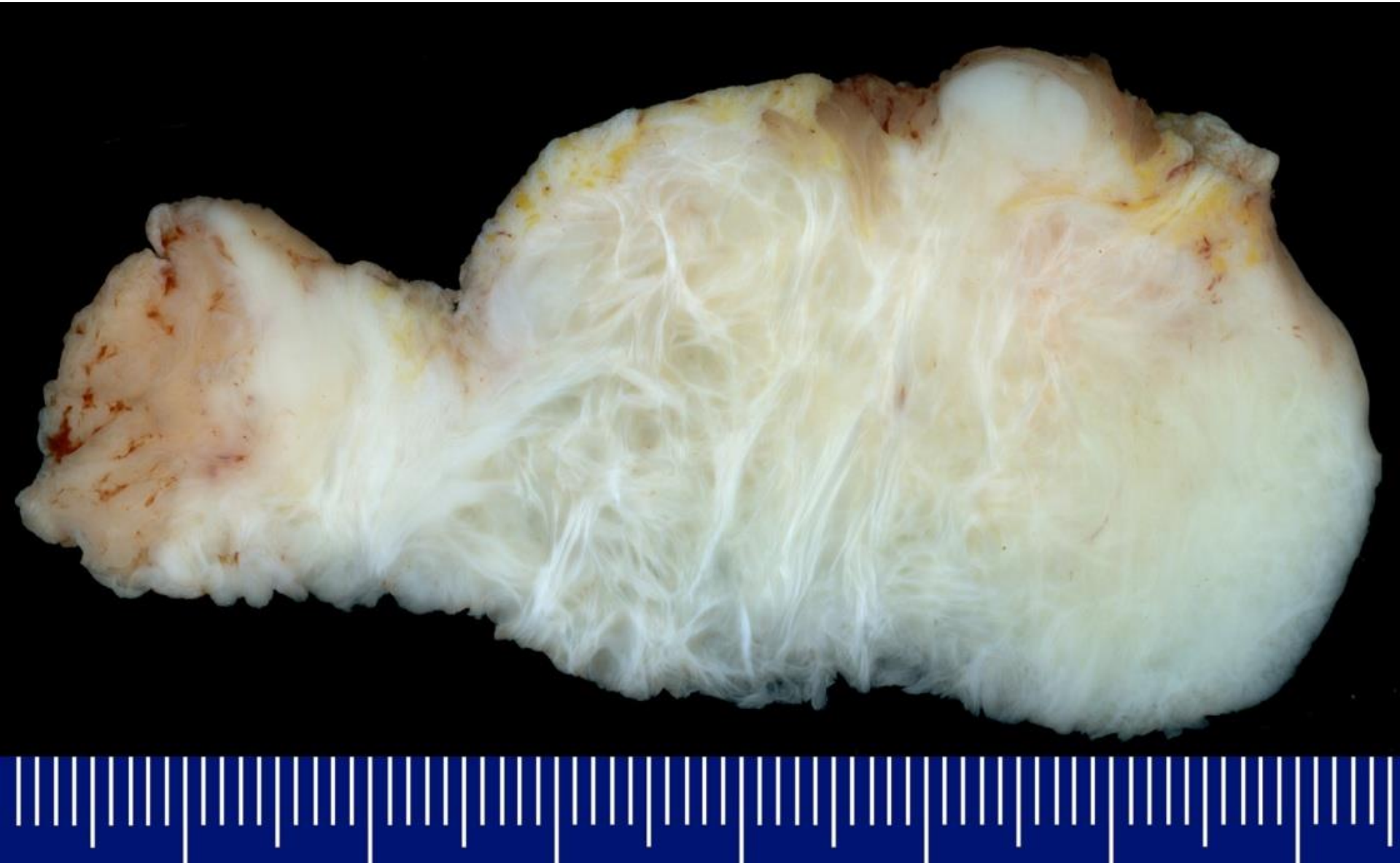


**TABLE 4–1 RECURRENT CHROMOSOMAL TRANSLOCATIONS IN BENIGN AND MALIGNANT SOFT TISSUE TUMORS**

| Soft tissue tumor | Translocation | Gene fusion | Approximate prevalence[1] |
|---|---|---|---|
| Alveolar rhabdomyosarcoma | t(2;13)(q35;q14) | *PAX3-FKHR* | 65% |
| | t(1;13)(p36;q14) | *PAX7-FKHR* | 15% |
| Angiomatoid fibrous histiocytoma | t(2;22)(q33;q12) | *EWS-CREB1* | * |
| | t(12;22)(q13;q12) | *EWS-ATF1* | * |
| | t(12;16)(q13;p11) | *FUS-ATF1* | * |
| Alveolar soft part sarcoma | t(X;17)(p11;q25)[2] | *ASPL-TFE3* | >95% |
| Clear cell sarcoma | t(12;22)(q13;q12) | *EWS-ATF1* | >90% |
| | t(2;22)(q33;q12) | *EWS-CREB1* | * |
| Dermatofibrosarcoma protuberans/giant cell fibroblastoma | t(17;22)(q21;q13)[3] | *COL1A1-PDGFB* | >90% |
| Desmoplastic fibroblastoma | t(2;11)(q31;q12) | Unknown | * |
| Desmoplastic small round cell tumor | t(11;22)(p13;q12) | *EWS-WT1* | >95% |
| Epithelioid hemangioendothelioma | t(1;3)(p36.3;q25) | Unknown | * |
| Extraskeletal myxoid chondrosarcoma | t(9;22)(q22-q3;q12) | *EWS-NR4A3* | 75% |
| | t(9;17)(q22:q11) | *TAF15-NR4A3* | 25% |
| Ewing sarcoma/PNET | t(11;22)(q24;q12) | *EWS-FLI1* | 90% |
| | t(21;22)(q22;q12) | *EWS-ERG* | 5% |
| | t(7;22)(p22;q12) | *EWS-ETV1* | <1% |
| | t(2;22)(q33;q12) | *EWS-FEV* | <1% |
| | t(17;22)(q12;q12) | *EWS-E1AF* | <1% |
| | t(16;21)(p11;q22) | *FUS-ERG* | <1% |
| Fibromyxoid sarcoma (low-grade) | t(7;16)(q33;p11.2) | *FUS-CREB3L2* | >95% |
| | t(11;16)(p13;p11.2) | *FUS-CREB3L1* | <5% |
| Giant cell tumor of tendon sheath | t(1;2)(p13;q37) | *CSF1–COL6A3* | * |
| Infantile fibrosarcoma | t(12;15)(p13;q26) | *ETV6-NTRK3* | >95% |
| Inflammatory myofibroblastic tumor | t with 2p23 | *ALK* fusions | >50% |
| Lipoblastoma | t with 8q12 | *PLAG1* fusions | * |
| Lipoma, ordinary | t with 12q15 | *HMGA2* fusions | * |
| | t with 6p21 | *HMGA1* rearrangements[4] | * |
| Myxoid/round cell liposarcoma | t(12;16)(q13;p11) | *FUS-CHOP* | >95% |
| | t(12;22)(q13;q11) | *EWS-CHOP* | <5% |
| Pericytoma | t(7;12)(p2;q13) | *ACTB-GLI* | * |
| Synovial sarcoma | t(X;18)(p11.2;q11.2) | *SYT-SSX1* | 65% |
| | | *SYT-SSX2* | 35% |
| | | *SYT-SSX4* | <1% |

[1] Insufficient data to estimate prevalence.
[2] Translocation usually present in unbalanced form as der(X) only (see text for details).
[3] Translocation usually present and amplified as ring chromosome (see text for details).
[4] *HMGA1* rearrangements usually do not result in fusion transcripts (see text for details).

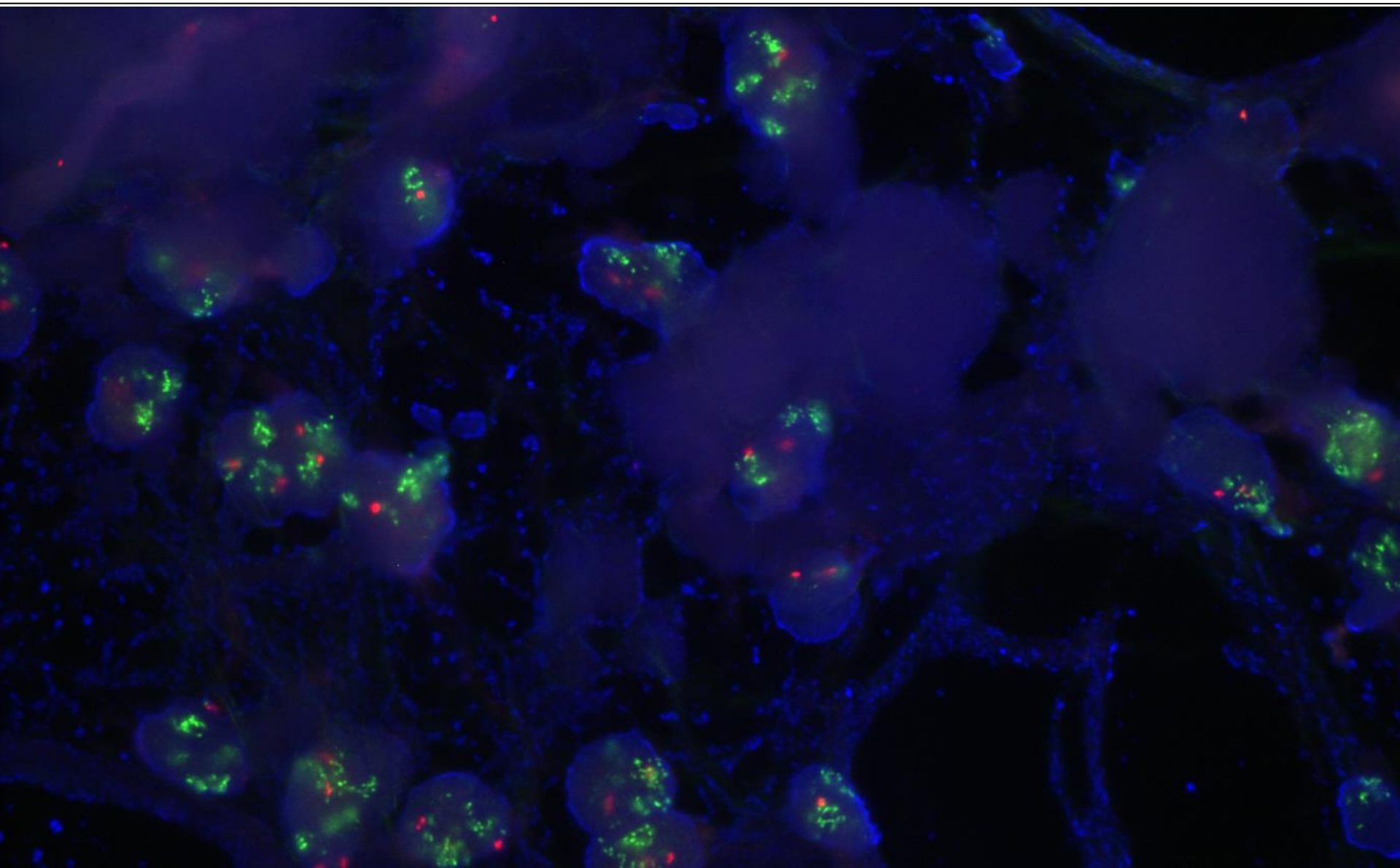
# Tumorspezifische Translokationen / Amplifikationen / Genumlagerungen

Tumortyp und involvierte Gene

| | |
|---|---|
| Ewing-Sarkom/PNET | **EWS-FLI1, EWS-ERG, EWS-ETV1** |
| Desmoplastic small round cell tumor | **EWS-WT1** |
| Klarzellsarkom | **EWS-ATF1** |
| myxoides Chondrosarkom | **EWS-TEC** |
| alv. Rhabdomyosarkom | **PAX3-FKHR, PAX7-FKHR** |
| Myxoides Liposarkom | **CHOP-TLS, CHOP-EWS** |
| Synovialsarkom | **SYT-SSX** |
| DFSP | **PDGFB-COL1A1** |
| ALT / Liposarkom | **MDM2 / CDK4 Amplifikation** |

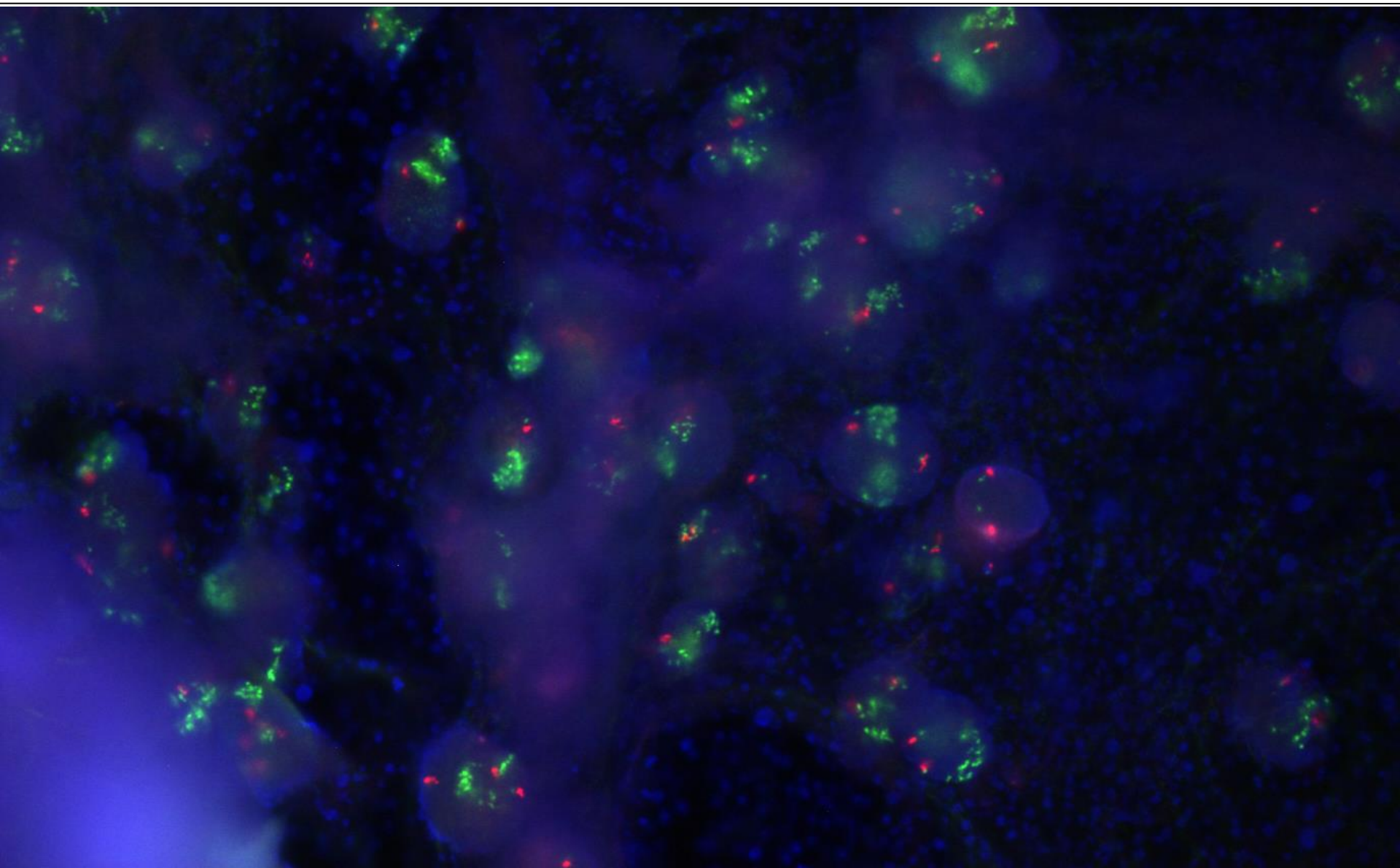
# Fluoreszenz in situ Hybridisierung (FISH)

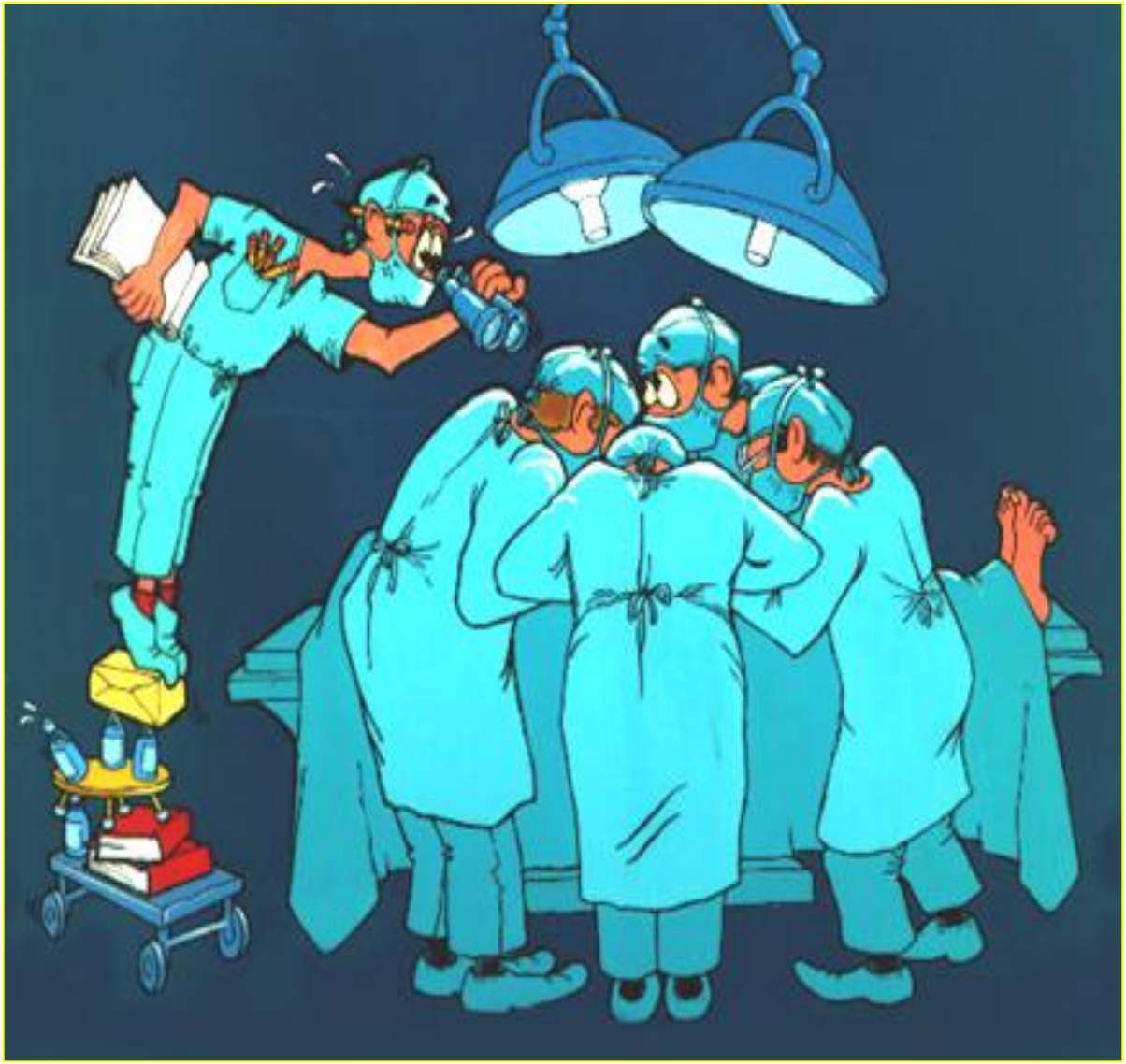
MDM2 Amplifikation bei einem atypischen lipomatösen Tumor (ALT)



# Fluoreszenz in situ Hybridisierung (FISH)

MDM2 Amplifikation bei einem atypischen lipomatösen Tumor (ALT)



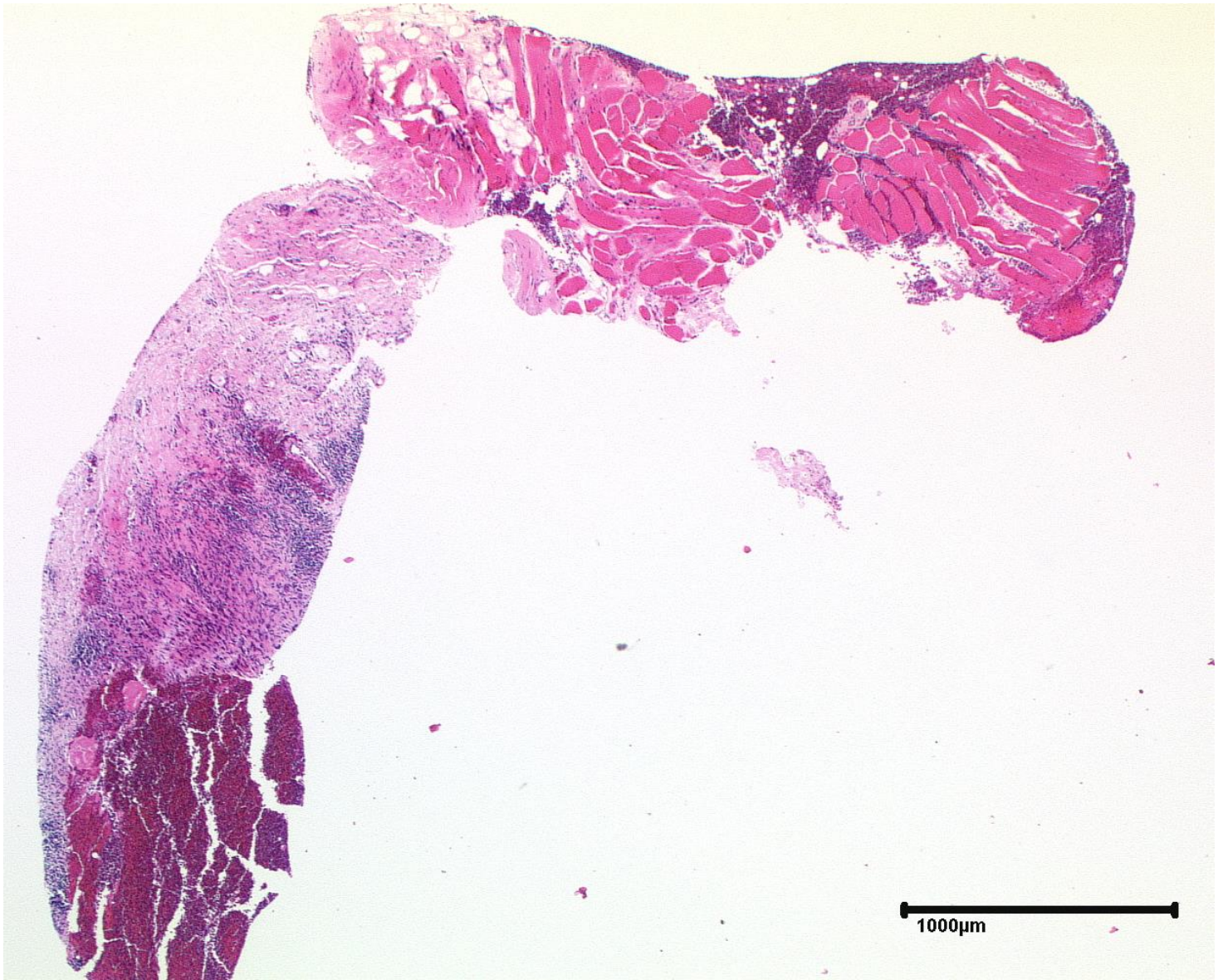


# Pathologe als Partner des Klinikers

# Stanzbiopsie, CT-gesteuert

Klinisch hochgradiger Verdacht auf ein Sarkom des M. deltoideus rechts

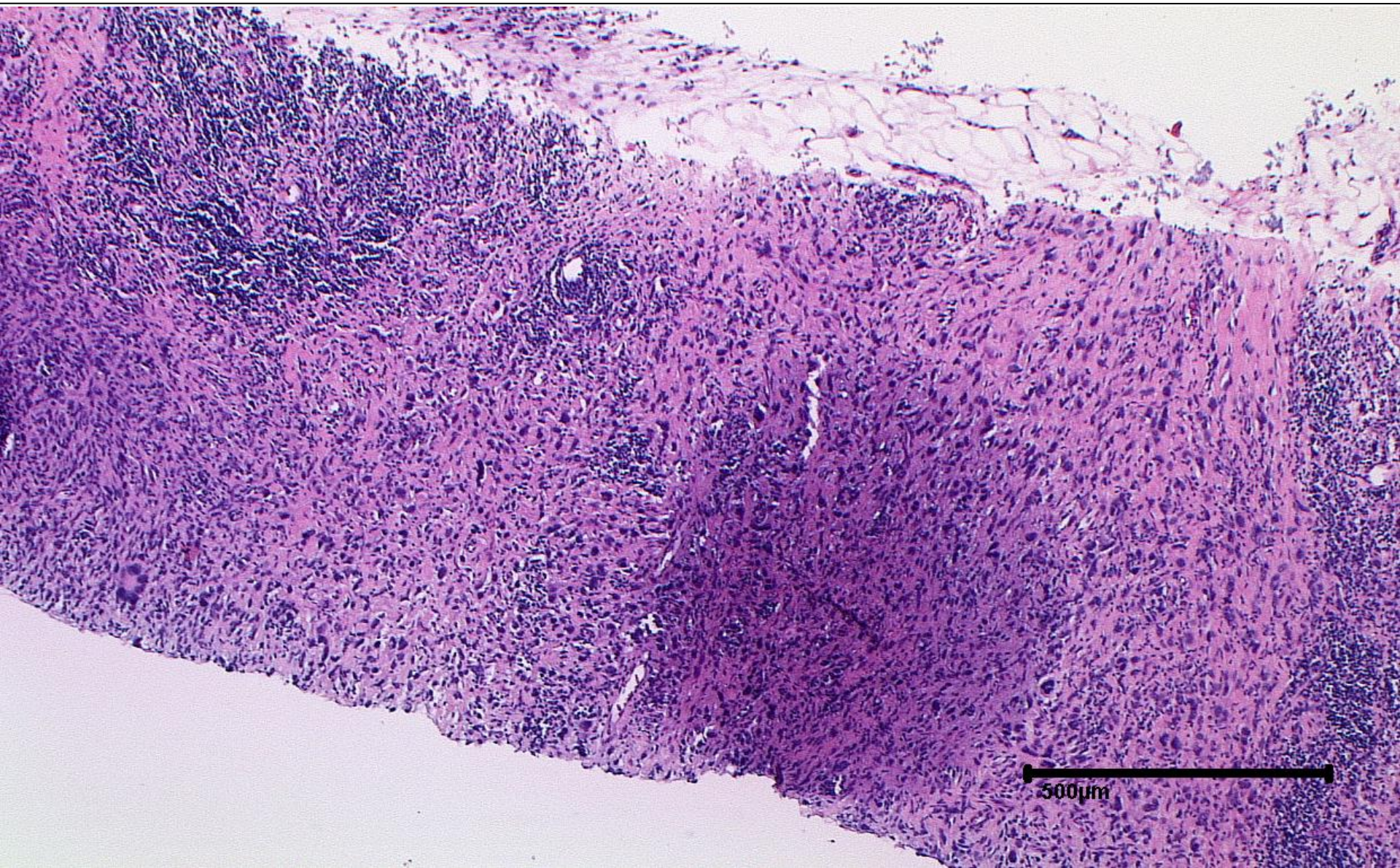
**Befund:** Kein Tumornachweis, regelrechte Muskulatur, Entzündung



# Stanzbiopsie, Rebiopsie

Verdacht auf ein Sarkom des M. deltoideus rechts

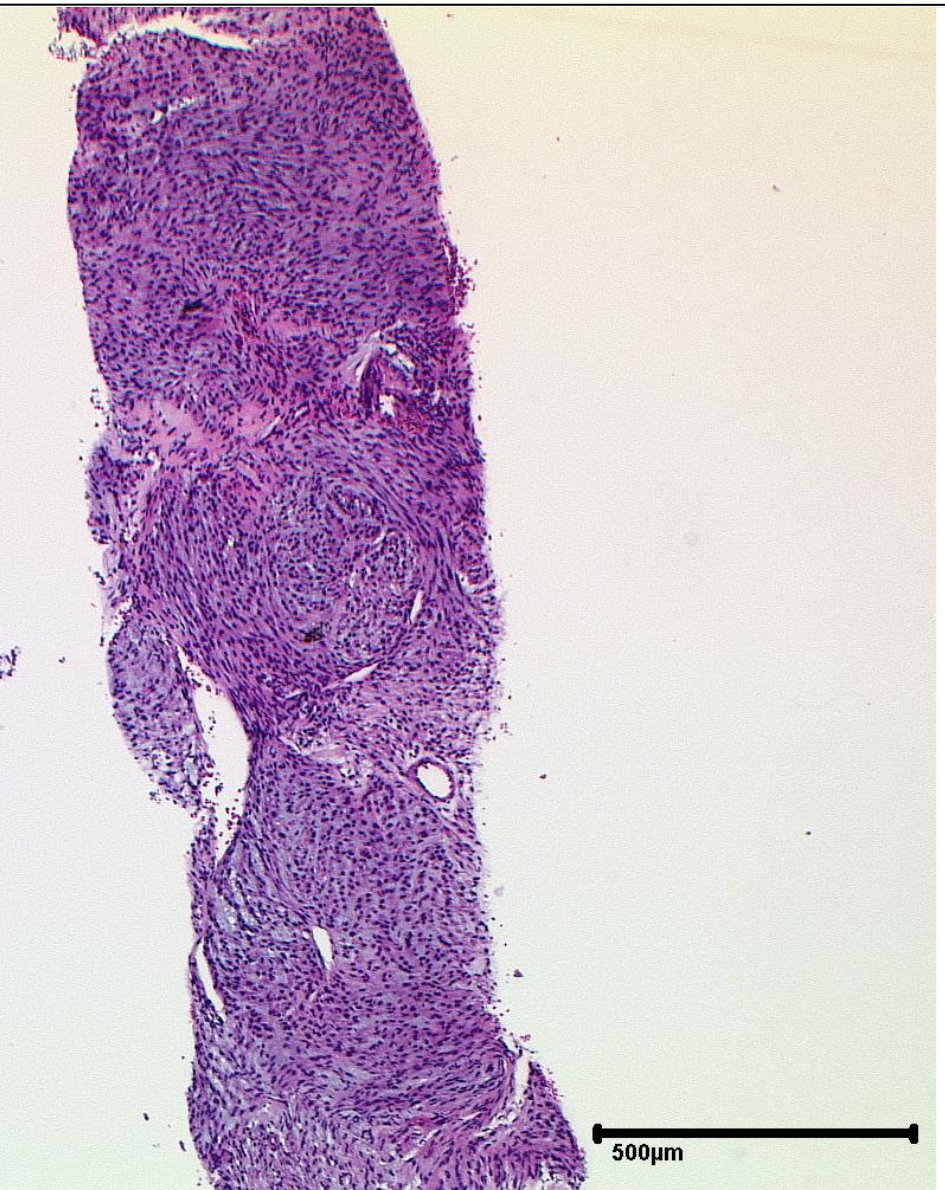
**Befund:** pleomorphes Sarkom als Rezidiv eines pleomorphen Liposarkoms



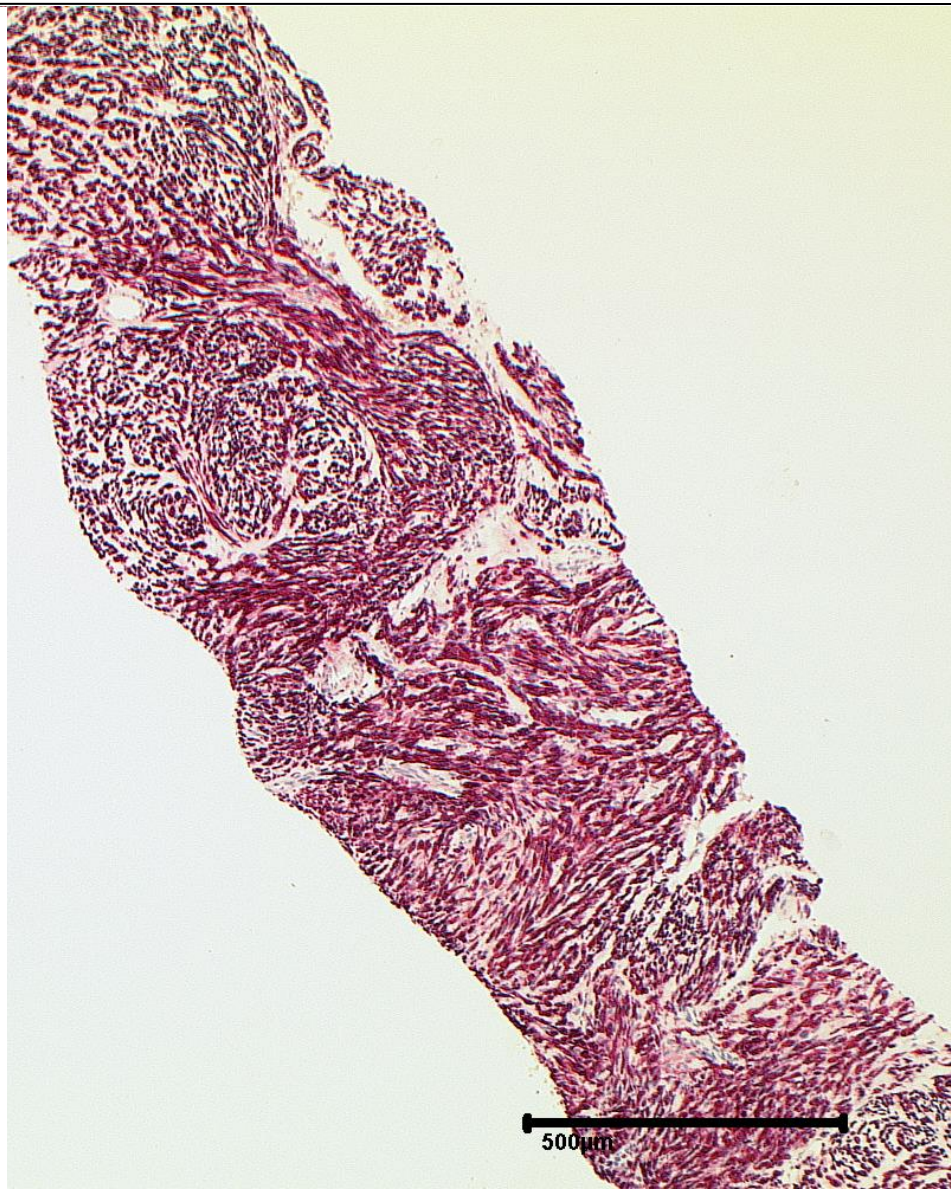
# Stanzbiopsie, CT-gesteuert

Rezidiv eines bekannten Leiomyosarkoms

HE

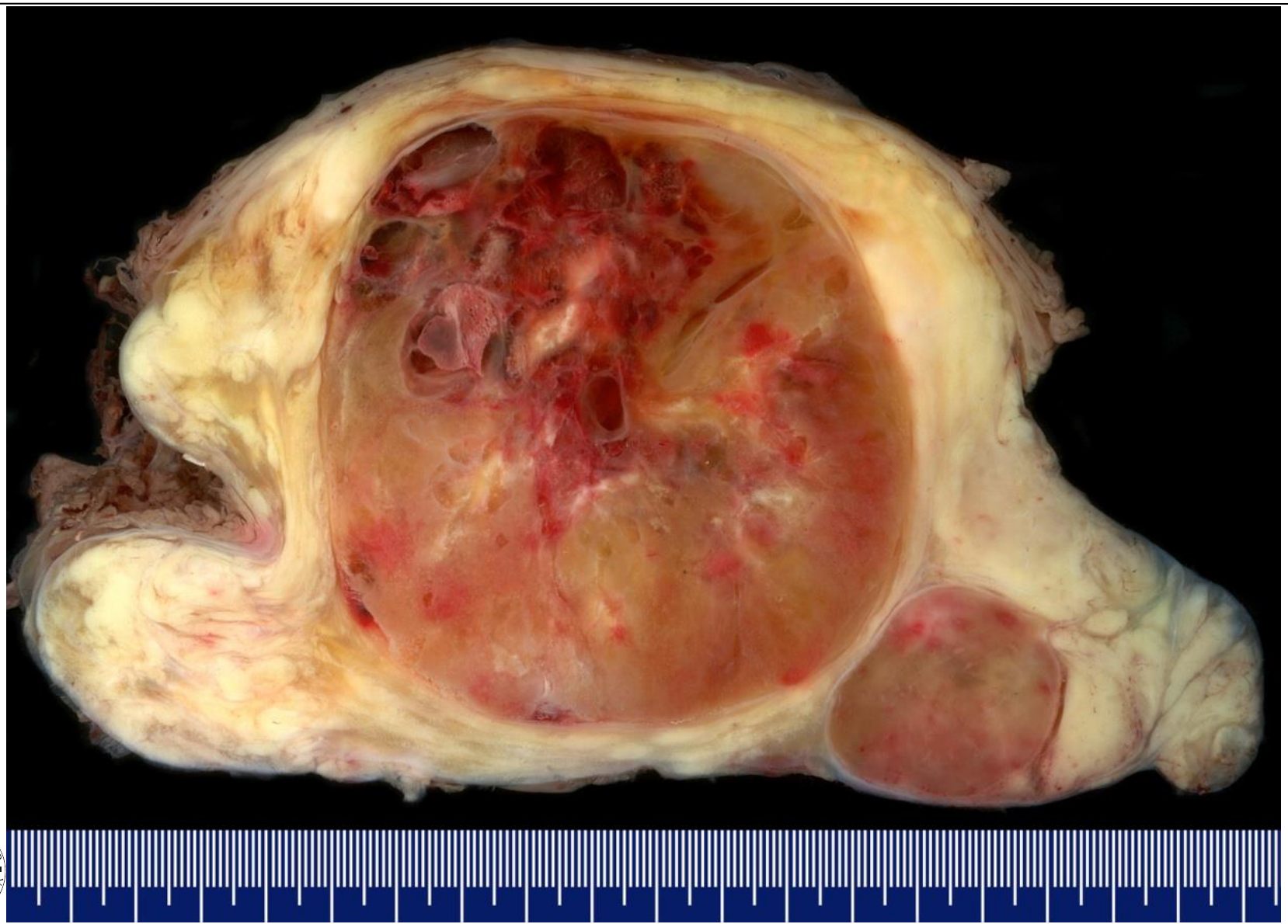



Desmin (Immunhistochemie)



# Liposarkom

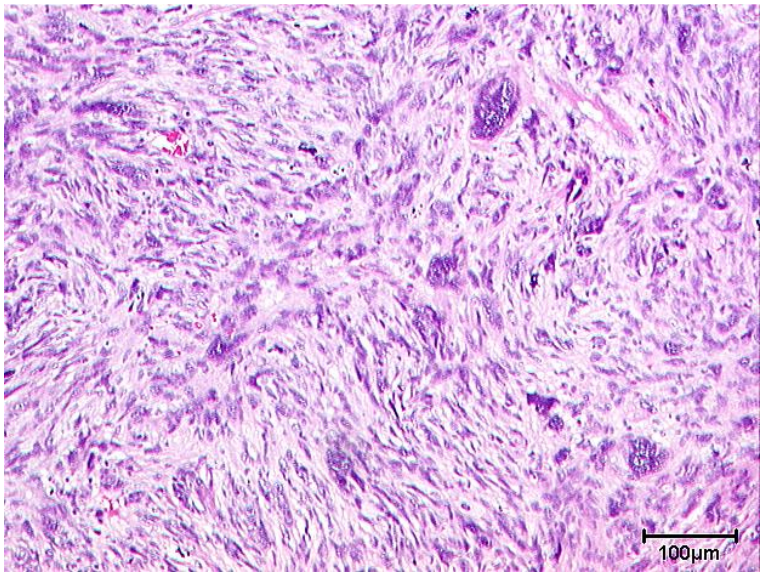
Dedifferenziertes Liposarkom

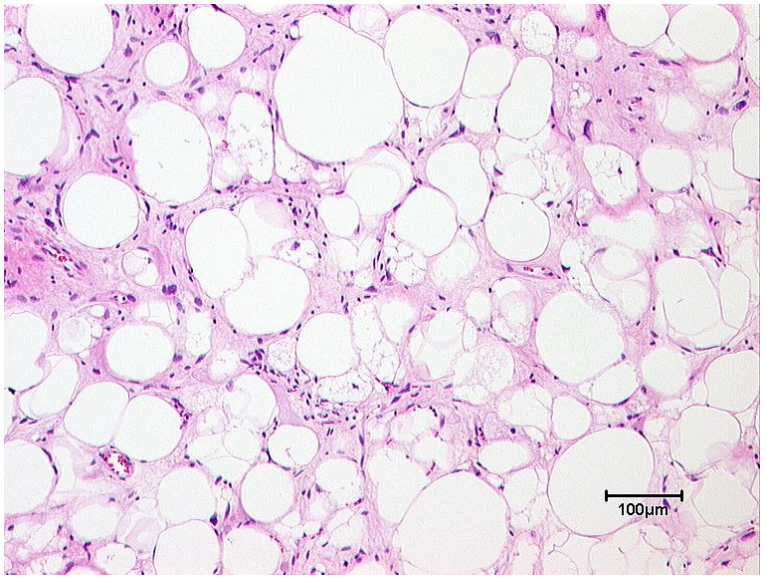


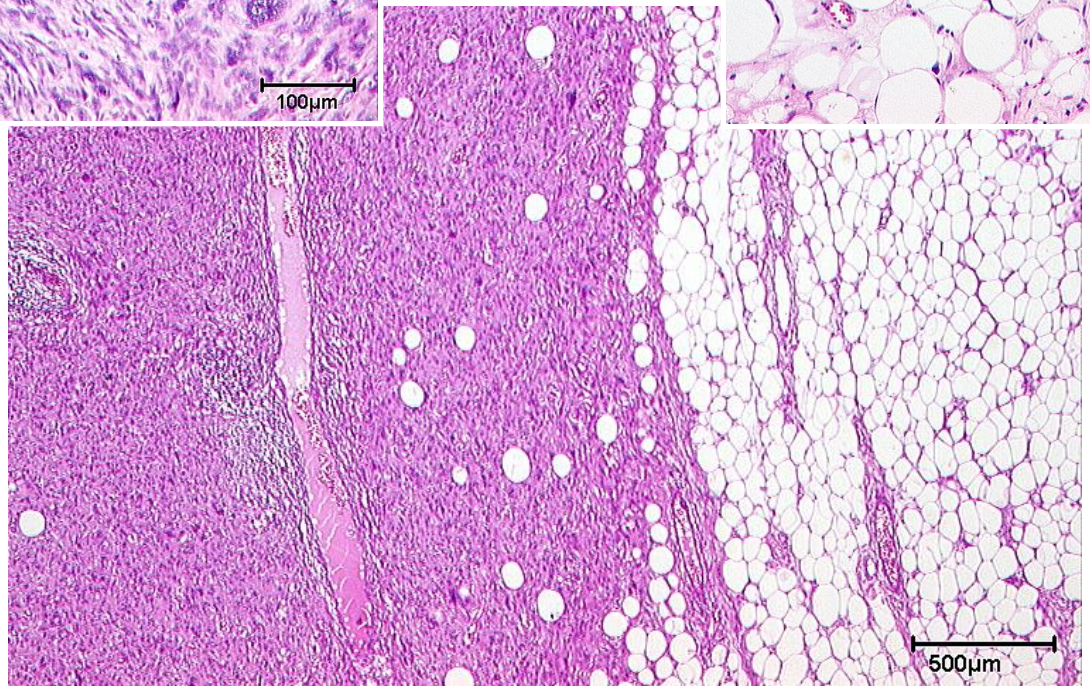
# Liposarkom

Dedifferenziertes Liposarkom

„Nebeneinander“ von undifferenzierter und gut differenzierter Komponente



# Grading von Weichgewebssarkomen

Histologischer Differenzierungsgrad

| | **Dreistufiges Gradingsystem** (FNCLCC) | **Vierstufiges Gradingsystem** (UICC) |
|---|---|---|
| niedriggradig | Grad 1 | Grad 1 |
| | - | Grad 2 |
| hochgradig | Grad 2 | Grad 3 |
| | Grad 3 | Grad 4 |

# Grading von Weichgewebssarkomen

## Grading Parameter des FNCLCC – Systems

| Histological parameter | Definition |
|---|---|
| **Tumour differentiation** (see Table 1.2) | • Score 1: Sarcomas closely resembling normal adult mesenchymal tissue and potentially difficult to distinguish from the counterpart benign tumour (e.g. well-differentiated liposarcoma, well-differentiated leiomyosarcoma)<br>• Score 2: Sarcomas for which histological typing is certain (e.g. myxoid liposarcoma, myxofibrosarcoma)<br>• Score 3: Embryonal and undifferentiated sarcomas, synovial sarcomas, sarcomas of doubtful type |
| **Mitotic count** (established on the basis of 10 HPF; 1 HPF measures 0.1734 $mm^2$) | • Score 1: 0–9 mitoses per 10 HPF<br>• Score 2: 10–19 mitoses per 10 HPF<br>• Score 3: > 19 mitoses per 10 HPF |
| **Tumour necrosis** | • Score 0: no necrosis<br>• Score 1: < 50% tumour necrosis<br>• Score 2: ≥ 50% tumour necrosis |
| **Histological grade** | • Grade 1: total score 2, 3<br>• Grade 2: total score 4, 5<br>• Grade 3: total score 6, 7, 8 |

FNCLCC, Fédération Nationale des Centres de Lutte Contre le Cancer; HPF, high-power field

Modified from {494}

| Histological type | Differentiation score |
|---|---|
| Well-differentiated liposarcoma | 1 |
| Well-differentiated leiomyosarcoma | 1 |
| Malignant neurofibroma | 1 |
| Well-differentiated fibrosarcoma | 1 |
| Myxoid liposarcoma | 2 |
| Conventional leiomyosarcoma | 2 |
| Conventional MPNST | 2 |
| Conventional fibrosarcoma | 2 |
| Myxofibrosarcoma | 2 |
| Myxoid chondrosarcoma | 2 |
| Conventional angiosarcoma | 2 |
| High-grade myxoid (round cell) liposarcoma | 3 |
| Pleomorphic liposarcoma | 3 |
| Dedifferentiated liposarcoma | 3 |
| Rhabdomyosarcoma | 3 |
| Poorly differentiated/pleomorphic leiomyosarcoma | 3 |
| Poorly differentiated/epithelioid angiosarcoma | 3 |
| Poorly differentiated MPNST | 3 |
| Malignant Triton tumour | 3 |
| Synovial sarcoma | 3 |
| Extraskeletal osteosarcoma | 3 |
| Extraskeletal Ewing sarcoma | 3 |
| Mesenchymal chondrosarcoma | 3 |
| Clear cell sarcoma | 3 |
| Epithelioid sarcoma | 3 |
| Alveolar soft part sarcoma | 3 |
| Malignant rhabdoid tumour | 3 |
| Undifferentiated (spindle cell and pleomorphic) sarcoma | 3 |

FNCLCC, Fédération Nationale des Centres de Lutte Contre le Cancer; MPNST, malignant peripheral nerve sheath tumour

Modified from {494}

# Grading von Weichgewebssarkomen

Limitationen eines Gradings

- Per definitionem high grade sind:
  - PNET / Ewingsarkome
  - Angiosarkome (bis auf kutane „low grade“ Variante)
  - Pleomorphe Liposarkome
  - Rhabdomyosarkome
  - Desmoplastic small round cell tumor

- Per definitionem low grade sind:
  - ALT / gut differenziertes lipomähnliches Liposarkom
  - Infantile Fibrosarkome
  - Dermatofibrosarkoma protuberans

- Tumoren mit Grading ohne wesentliche prognostische Bedeutung
  - Klarzellsarkome
  - Epitheloide Sarkome
  - Synovialsarkome
  - „low grade“ fibromyxoides Sarkom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