and nodular basal cell carcinoma have also been reported. In most patients with this type of tumor, they were located on the head and trunk. The development of adnexal tumors such as panfolliculoma has rarely been described on upper and lower limbs.

Panfolliculoma is a tumor that exhibits features of benign tumors with variably sized tumor nests, alternating solid, cystic and solid-cystic structures. The islets are mainly composed of follicular germinative cells with differentiation to the lower segment (bulb and stem), isthmus and infundibulum of the hair follicle. Cystic structures often show shadow or ghost cells with amphophilic keratin similar to the keratinized inner root sheath [2].

Differential diagnosis is mainly performed with cystic trichoblastoma with advanced follicular differentiation. Panfolliculoma is characterized by a more prominent epithelial component, rather than the stromal one [3]. Likewise, matricial differentiation is not a common finding in trichoblastoma, although, depending on the author, these two entities may represent different degrees in the spectrum of adnexal neoplasms with follicular differentiation [4, 5].

Immunohistochemical study usually shows positivity for cytokeratins 5,6,14,17,18 and 19, which are the keratins expressed in the different epithelial structures of normal hair follicle. The expression of CK19 is a controversial issue in previous studies. CK19 is expressed in the outer root sheath and the follicular bulge regions but is always absent in interfollicular epidermal keratinocytes. Recently, Gonzalez-Guerra and Requena [6] also found focal positivity for calretinin in a case of panfolliculoma of their series. The authors studied the selective immunostaining that is evident in the innermost layer of the outer root sheath of normal hair follicles. This layer is characterized by being difficult to distinguish with routine haematoxylin-eosin staining.

In conclusion, we present a new case of panfolliculoma, with a certainly atypical location in relation to previously reported cases. We should take this into account in the differential diagnosis of any cutaneous adnexal neoplasm. ■

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Unexpected healing of radiation-induced scalp lesions with OTR4120, a heparan sulfate mimetic

An 80-year-old woman presented to us with two painful scalp lesions. The patient had a medical history of multiple basal cell carcinomas following Grenz ray radiation therapy in 1946 for seborrhoeic eczema on her scalp. The patient was diagnosed with two nodular basal cell carcinomas on the scalp. After excisions and full thickness transplantations, partial necrosis developed in the transplanted skin covering the lesions. Thereafter, two ulcers developed, both exposing the scalp bone.

Ulcerative lesions, a known complication of radiation therapy, are reported to be caused by the poor vascular and healing capacity of irradiated skin. Patients suffering from radiation-induced scalp lesions are often therapy resistant [1, 2].

Our patient had been treated for several months with a variety of wound dressings [3], with no sign of granulation at the wound edges or the base of the ulceration. Therefore, we chose a novel way of potentiating the tissue's ability to regenerate by the use of heparan sulfate (HS) mimetic OTR4120 [4]. Before starting this treatment (when the ulcers had been present for over 4 months), the larger wound measured 2.3×1.5 cm *(figure 1A)* and the smaller wound 1×0.5 cm. A gauze soaked with OTR4120 was applied for 10 minutes, twice weekly for 8 weeks,

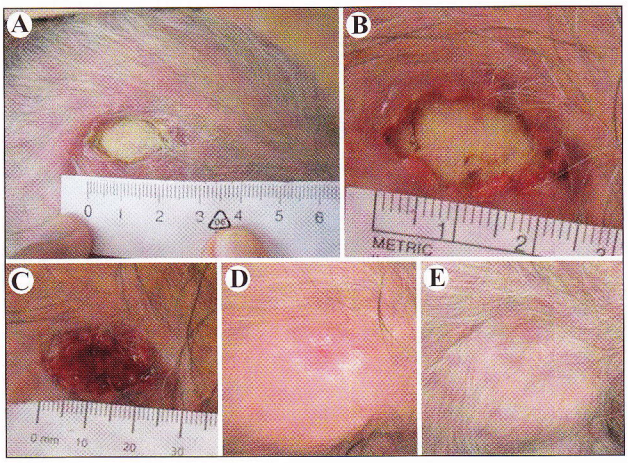

Figure 1. Radiation-induced scalp lesions in a woman known with multiple basal cell carcinomas later healed with heparan sulfate mimetic OTR4120. **A)** Largest ulcer before treatment with a heparan sulfate mimetic OTR4120. **B)** Granulation tissue formation, after 4 weeks of treatment. **C)** Lesion completely covered with granulation tissue after 6 weeks of treatment. **D)** Lesion completely covered at week 12. **E)** No recurrence of ulcer at week 24.

on the debrided wound. After 2 weeks the wound status markedly improved: granulation tissue formed at the wound edges. Over time the process of wound healing progressed *(figure 1B, C)*. Noticeably, after one month, the patient's wellbeing improved and she reported the absence of pain. During treatment weeks 2 to 8, vital granulation tissue grew from the wound edges over the dry bony structure until granulation tissue completely covered the ulcer. Treatment was ceased at week 8 when granulation tissue entirely covered the wounds. At this time the wounds measured 1.5×0.8 cm and 0.2×0.2 cm; hereafter, we applied only inert wound dressings until the wounds were closed at week 12 *(figure 1D)*. When the patient returned to our unit 24 weeks after start of treatment, the ulcers had remained completely healed *(figure 1E)*.

In healthy tissue, the extracellular matrix (ECM) consists of a network of scaffold proteins that are bridged by sugar-based polymers, called glycosaminoglycans, of which HS is a prominent example. HS is not only a structural element of tissue architecture, but is also a storage and protection site of a large variety of locally synthesized HS-bound polypeptides. These include chemokines, angiogenic factors, morphogens, and GFs. In this way, HS regulates the bioavailability of these signals and maintains the delicate balance between tissue integrity and tissue disruption, allowing the cellular tissue components to unfold their natural mechanism to achieve tissue homeostasis. However, in an acute wound healing process, inflammatory cells activate the production of glycanases and proteases that destroy the ECM, including HS. Through this degradation, the orchestrating role of HS in GF sequestration is lost [5].

In wound tissue, protease and glycanase-resistant OTR4120 can replace the degraded HS and bind to the free HS-binding sites that become available following HS degradation. The affinity constant of OTR4120 toward matrix proteins allows a tight binding. This makes a short term exposure to OTR4120 sufficient. Once OTR4120 is in place in the matrix scaffold, the growth signaling peptides can be positioned through OTR4120 binding in this restored micro-environment. In this way, OTR4120 is thought to offer a matrix therapy that restores the natural cellular microenvironment and the endogenous signaling of cell communications needed for tissue regeneration, thereby halting the self-perpetuating cycles, particularly in impaired healing wounds [6].

This patient with treatment-resistant scalp ulcers derived benefit from this OTR4120 treatment, which might also be used for other hard-to-heal skin wounds of arterial, venous or diabetic origin. ■

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Occipital bone dysplasia associated with diffuse plexiform neurofibroma

Neurofibromatosis type 1 (NF1) is an autosomal dominant genetic disease characterized by café-au-lait spots, neurofibroma, freckling, optic glioma, Lisch nodules, and osseous abnormalities. NF1-associated sphenoid wing dysplasia is a rare complication but occurs in 3-7% of cases with or without diffuse plexiform neurofibroma [1]. However, there have been few reports of occipital bone dysplasia in a patient with NF1 [2]. We report a rare case of occipital bone dysplasia with diffuse plexiform neurofibroma.

A 17-year-old Japanese male with NF1 presented with a large tumour on his right scalp. The tumour had gradually increased in volume. Physical examination revealed a soft, painless, diffuse plexiform neurofibroma, approximately 20×15 cm in size, on his right posterotemporal scalp with multiple café-au-lait spots and freckling on his trunk *(figure 1A)*. In addition, a 3 cm bone defect, was palpable on the lambdoid suture. Magnetic resonance imaging showed a diffuse plexiform neurofibroma on the scalp and an arachnoid cyst in the vermis of the cerebellum *(figure 1B)*. Three-dimensional computed tomography revealed two defects in his occipital bone under the tumour *(figure 1C)*. We have carefully followed-up the patient.

Diffuse plexiform neurofibroma occurs in 26.7% of patients with NF1 [3]. It usually appears shortly after birth, enlarges gradually during lifetime and sometimes causes life-threatening massive intra-tumour haemorrhaging. However, it has been reported that 42% of the tumours arise on the head and neck region [4]. Surgical management of diffuse plexiform neurofibroma carries a significant risk for bleeding and is technically difficult. In addition, when the tumour is located on the orbit, we have to be careful about the possibility of sphenoid wing dysplasia (absence of the wall of the orbit). This condition can result in pulsating exophthalmos and severe cosmetic disfigurement. In our case, the tumour was located on the scalp, but occipital bone dysplasia were found under the tumour. As far as we know, there is no previous report of multiple occipital bone