INTRODUCTION
The reason why malignant melanoma is considered as a radioresistant tumor is not clear. As early as 1939 Ellis (1) described the definite response to radiation of 12 melanomas at different sites. Since then several authors have reported the successful use of radiation in melanoma (2,3,4,5,6,7,8). Two possible explanations of the unbelief in radiotherapy are the infrequent referral in this mainly surgically treated disease (1) or the extremely slow regression rate that is sometimes seen after radiation and that has been interpreted as radioresistance (7). Reading the literature on radiotherapy of melanoma is not easy, because sometimes cutaneous and other melanomas are grouped together and within the group of cutaneous melanoma irradiation has been used for the primary tumor, post-operatively, for local recurrence, for regional lymph node metastases and for distant metastases in skin, bone or brain. Within the group of cutaneous melanomas the radiosensitivity varies from very good (for lentigo maligna melanoma) to good (for superficial spreading melanoma) to fair (for nodular melanoma) (8,21). All types of irradiation have been used, like external beams (X rays or electrons), superficial applicators, interstitial needles or seeds.

REVIEW OF THE LITERATURE
A distinction has to be made between articles on radiotherapy with curative intention (alone, electively or post-operatively), with the aim of local control (of primary, recurrence or regional metastases) or with only palliative purposes (local, regional or distant). Hellriegel (9) and von Lieven and Skopal (4) reported on the German experience in treating the primary tumor with very high doses of 5,500 to 15,000 R, using local healing and survival as parameters. Hornsey (5), Strauss et al (10) and Johanson et al (11) treated local recurrences with fairly good response and sometimes local control. Post-operative irradiation was used rou-
tinely by Nitter (12), Dickson (13) and Harwood et al (14) with high local control rates and prolonged survival. Nitter also initiated the elective irradiation of regional lymph node areas with doses of 3500-4000 R and claimed an increased survival. The use of irradiation in the palliation of lymph node metastases in brain, bone or skin has been reported extensively with fair to good success (2,3,4,5,6,7,15,16,17,18,19). In general malignant melanoma is considered as a tumor with varying but distinct radiosensibility. Responses are usually better with a higher total dose (1,7,9,13,20), with a shorter treatment time (1,7) and especially with a higher dose per fraction (3,5,6) as can be explained by radiobiological data.

RADIOBIOLOGICAL CONSIDERATIONS

Cell survival curves obtained in vitro in experimental melanoma models showed a large shoulder before becoming exponential (22,23), indicating that the cells had a large capacity to accumulate and possibly repair sublethal damage (5). This might explain the radioresistance of melanoma cells to fractionated radiotherapy. Hornsey (25) calculated a "wasted dose" in each fraction of 274 rad. Studies on human melanomas grown in nude mice by Rolstad et al (25,26) showed a greater growth delay when irradiation was combined with the hypoxic cell sensitizers Metronidazole, Misonidazole or high dose DTIC, indicating that melanomas may contain hypoxic cells. This evidence has been supported by encouraging results using irradiation combined with hyperbaric oxygen (15) or hyperthermia (20).

The concept of a higher fraction dose giving a better chance for response has been tested and proven valid by many investigators (3,5,6,10,14), although some authors have produced the same good response with normal fractionation (7,18,19).

THE LEIDEN EXPERIENCE

The records of twenty patients treated at the department of Radiotherapy from 1977-1982 have been studied retrospectively. All patients had a known cutaneous melanoma and were referred for palliation with cutaneous or subcutaneous metastases, lymph node metastases, osseous metastases or brain metastases. A total of 49 localizations have been irradiated, with a dose per fraction of either 2.5 Gy, 6 Gy or 8 Gy. Radiation was given with 4 or 8 MeV electron beams to superficial lesions and with Co^{60} or 5-8 MV photons to more deeply located metastases. Response was evaluated as regression of