Number of Patients (n=)	Treatment Groups	Vaccine Composition	Treatment protocol	Treatment Duration	Outcomes Measured	Key Findings	Ref
Melanoma							
n=24 patients with metastatic, surgically incurable melanoma	**Single-arm treatment group:** DNP-modified autologous tumor vaccine	Autologous, cryopreserved melanoma cells Irradiated (25 Gy) Haptenated Mixed with BCG	CY (300 mg/m² i.v.) before treatment Topical DNP sensitization Monthly i.d. injections (every 28d)	2–4 months, with vaccine administered every 28d (2–4 injections).	DTH Clinical signs of inflammation Cell infiltration Tumor response	• DTH to DNP- was induced in 22/24 patients • Inflamed metastatic lesions demonstrated marked lymphocyte infiltration, predominantly CD8+ T cells expressing HLA-DR. • Tumor regression observed in 5 patients; disease stabilization for 3-6 months in 2 patients	[39]
n=12 patients with surgically incurable, metastatic melanoma	**Single-arm treatment group**: DNP-modified autologous tumor vaccine	Autologous, cryopreserved melanoma cells Irradiated (25 Gy) Haptenated Mixed with BCG	Pre-vaccination sensitization using topical 1% DFNB CY (300 mg/m² i.v.) before sensitization and treatment DNP-vaccine injections were administered every 28d	Post-treatment tumor biopsies collected **2–6 months** after therapy initiation (median = 3.5 months)	Immunophenotyping of infiltrations Histopathology	• T-cell infiltration increased significantly in post-treatment tumors (vs. pre-treatment; median 41% vs. 9%, $P < 0.05$) • TILs were predominantly CD8⁺ (median CD8/CD4 ratio = 5.0) with high expression of activation markers: HLA-DR (48%), CD69 (56%), GD3 (68%) • Histopathology analysis revealed lymphocytic infiltration, satelitosis, and areas of tumor necrosis in treated lesions	[40]
284 patients with metastatic melanoma - stage III (n=261) / IV (n=23)	**Single-arm treatment group**: autologous DNP-modified melanoma cell vaccine	Autologous melanoma cells Irradiated (25 Gy) Haptenated Mixed with BCG	5 vaccination schedules (A–E): ID injections; low-dose CY (300 mg/m² i.v.); +/-DNFB sensitization ; different doses	**A:** 8 monthly doses **B/C:** 12 weekly doses **D/E:** 6 weekly doses with boost	DTH response to modified/unmodified tumor cells or PPD (ctrl) RFS and OS Autoimmunity and local reactions	• 57% of patients developed a positive DTH response (≥ 5 mm) to unmodified tumor cells • Patients who developed strong DTH responses had significantly better survival outcomes • Higher proportions of dead tumor cells in the vaccine were associated with stronger DTH responses • Vaccine was well tolerated with no cases of systemic autoimmunity	[41]
297 patients with metastatic melanoma - Stage III (adjuvant, n=214)/IV (metastatic, n=83)	**Single-arm treatment group**: autologous DNP-modified melanoma cell vaccine	Autologous melanoma cells Irradiated (25 Gy) Haptenated Mixed with BCG	5 vaccination schedules (A–E): i.d. injections; low-dose CY (300 mg/m² i.v.); DNFB sensitization in groups A-C; dose ranges	**A:** 8 monthly doses **B/C:** 12 weekly doses **D/E:** 6 weekly doses with boost	DTH RFS and OS Autoimmunity and local reactions	• ~50% developed DTH to **unmodified tumor cells :** strongly predict longer survival • **Stage IV (metastatic melanoma):** 11 clinical objective responses (2 CR, 4 PR, 5 mixed); • **Stage III :** 5-year survival 46% overall ; DTH response (≥10 mm) OS: 38 months vs DTH response <10 mm OS: 16 months • Safety profile was favorable: mostly local and mild; no systemic autoimmunity observed	[43]
214 patients with stage III melanoma Stage IIIC (n=117) / IIIB (n=97)	**Single-arm treatment group**: autologous, DNP-modified melanoma cell vaccine	Autologous melanoma cells Irradiated (25 Gy) Haptenated Mixed with BCG	4 vaccination schedules (A–D): i.d. injections; low-dose CY (300 mg/m² i.v.); dose ranges	**A**: vaccine *before* CY **B-D**: vaccination given *after* CY at varying intervals	OS and RFS Post-relapse survival DTH	• 5-year OS: 44%; 5-year RFS: 33% • Patients with positive DTH (≥ 5 mm) to unmodified tumor cells had significantly higher 5-year OS (59.3% vs. 29.3%) • DTH to unmodified tumor cells is higher after induction doses, at shorter intervals • Vaccine was well tolerated, with only mild local reactions and no cases of systemic autoimmunity	[44]
27 patients with metastatic melanoma	**Single-arm treatment group**: DNP-modified autologous melanoma cell vaccine	Autologous melanoma cells Irradiated (25 Gy) Haptenated	CY (300 mg/m² i.v.) before DNP sensitization and before each vaccination cycle ID administration of treatment - 4 week intervals	Vaccination was continued for **up to 8 months**	DTH *I*PBLproliferation Cytokine production Cytotoxicity assays Anti-DNP antibody responses	• PBL proliferation in response to DNP-modified autologous cells was observed • Patients developed IFN-γ–producing T cells (5/11), including CD8⁺ cytotoxic cells capable of MHC-restricted lysis of DNP-modified melanoma cells. • Anti-DNP antibodies were dosed in patient's serum post treatment.	[45]
43 patients: 28 with AJCC Stage III and 15 with AJCC Stage IV melanoma	**Single-arm treatment group**: adjuvant therapy with a DNP-modified autologous melanoma cell vaccine	Autologous melanoma cells Irradiated (110 Gy) Haptenated Mixed with BCG	CY (300 mg/m²) Topical DNP sensitization 8 vaccine doses over ~7 months, every 3–4 weeks	Approx. 7 months	DTH DFS OS Safety and tolerability	• DTH response (≥ 10 mm erythema) correlated with better OS (63 vs. 16 months for DTH-negative) • Multivariate analysis: weak/absent DTH associated with higher risk of recurrence and death. • Vaccine was safe, with no significant systemic toxicity	[46]
34 patients with stage III/IV metastatic malignant melanoma	**Primary treatment**: 27 patients received vaccine for active metastatic disease **Adjuvant setting**: 7 patients vaccinated after resection but later relapsed	Autologous melanoma cells Irradiated (110 Gy) Haptenated Mixed with BCG	CY (300 mg/m²) Topical DNP sensitization 8 vaccine doses over ~7 months, every 3–4 weeks		Tumor Response: CR, PR, stable disease, progression DTH OS Safety and tolerability	• Longer median OS when strong DTH compared with those with weak or negative DTH (54 vs. 21 months, $P = 0.013$) • ORR: 35% (4 CR [11.8%], 8 PR [23.5%]) • IL-2 enhances vaccine efficacy: 10/12 responders received IL2 • Durable responses: The tumor regressions (CR or PR) achieved after IL-2 + vaccine lasted a median of 6 months • No unexpected severe toxicities were reported. Two patients, both in whom tumour regressions occurred developed vitiligo	[47]
47 patients with AJCC stage III/IV melanoma Adjuvant group: 23 patients Therapeutic group: 24 patients	**Adjuvant group**: post-surgical patients **Therapeutic group**: patients with unresectable stage IV active melanoma	Autologous melanoma cells Irradiated (170 Gy) Haptenated Mixed with BCG	CY (300 mg/m²) Topical DNP sensitization Intradermal vaccine doses on D21 and every 3–4 weeks (up to 8 doses)	Core protocol: 8 vaccine doses administered over 5–6 months Boost injections: administered 3, 6, and 12 months	Clinical: OS, DFS, and objective tumor regression Immunologic: $CD4^+/CD8^+$ IFNγ ELISPOT, serum anti-livin and anti-gp100 IgG levels, DTH	• $CD8^+$ T-cell responses increased post-vaccination ($P = 0.035$) • $CD4^+$ T-cell responses correlated with OS in adjuvant group ($P = 0.04$) • Increased serum IgG against livin correlated with **prolonged overall survival ($P = 0.038$)** • MHC II expression on tumor cells was crucial for eliciting post-vaccination $CD4^+$ and $CD8^+$ responses	[50]
		Autologous melanoma cells	8 s.c. vaccine doses, every 3 weeks		OS and DFS	• No grade 3–4 adverse events reported	

126 patients with resected AJCC Stage IIIB (n=57) and IIIC (n=69) melanoma	**Single-arm treatment group**: autologous DNP-modified melanoma cell vaccine	Irradiated (230 Gy) Haptenated Mixed with BCG	CY (300 mg/m²) Topical DNP sensitization 1	Treatment lasted ~5 months (21–24 weeks)	DTH CTA gene expression Ipilimumab responses	• 5-year OS: 54% overall; 75% in strong DTH (≥15 mm) responders vs. 44% in weak responders (HR = 0.24; 95% CI 0.10–0.53; $P < 0.001$) • CTA gene expression (CTAG2, MAGEA1, SSX1, SSX4) correlated with better survival • Ipilimumab response: 3-year OS 46% in vaccinated vs. 19% in non-vaccinated, $P = 0.007$	[48]
10 melanoma patients with post-vaccine inflamed metastases	**Single-arm treatment group**: autologous, DNP-modified melanoma cell vaccine	Autologous melanoma cells Irradiated (25 Gy) Haptenated Mixed with BCG	Intradermal injection of DNP-modified autologous melanoma cells mixed with BCG	Not fixed; patients received serial doses of the cell vaccine,	TCR repertoire analysis Tumor infiltration by T-cells Tumor regression and patient survival	• Clonal T-cell expansions were detected in 9 of 10 post-vaccine tumors, • Clonal expansions were tumor-restricted, absent in matched PBL and control tumors • **Inflamed lesions** showed **dense intratumoral CD8⁺ T-cell infiltration** • **Associated with partial regression** of metastases in **3 of 4 evaluable cases**	[28]
Glioblastoma							
Interim analysis: 9 patients	**Intervention arm:** ERC1671 + GM-CSF + low-dose CY + bevacizumab (n=5) **Control arm:** Placebo + bevacizumab (n=4)	Autologous + Allogeneic tumor cells and lysates Haptenated Irradiated (25 Gy) Mixed with GM-CSF (500 µg)	28-day cycle: *Day 1:* Bevacizumab (10 mg/kg) *Days 2–5:* CY *Days 6–18 (±1):* 5 vaccine (or placebo) injections + GM-CSF *Day 15:* 2nd bevacizumab dose	Cycles repeated every 28d until disease progression or intolerance MRI scans every 8 weeks for tumor assessment	OS, PFS, and radiologic response CD4⁺ T-cell counts Adverse events graded using CTCAE v4.0	• Median OS: 12.1 months (ERC1671 + bevacizumab) vs. 7.6 months (placebo + bevacizumab) • Radiologic response rate: 75% in ERC1671 arm vs. 25% in placebo arm • CD4⁺ T-cell counts strongly correlated with OS in ERC1671 group only (R = 0.98, $P = 0.02$) • Vaccine was well tolerated, no grade 4/5 toxicities reported (injection site reaction and headache most frequent side effect)	[49]
21 patients with rGBM	**Single-arm treatment**: SITOIGANAP + GM-CSF + low-dose oral CY + bevacizumab + anti-PD-1 (nivolumab or pembrolizumab)	Autologous + Allogeneic tumor cells and lysates from 3 HLA-matched donors Haptenated Irradiated (25 Gy)	28-day cycle: *D1:* Bevacizumab + PD-1 inhibitor (nivolumab or pembrolizumab) *D2-5:* CY *D6, 9, 12, 15, 18 :* SITOIGANAP + GM-CSF	Cycles repeated every 28d until disease progression or intolerance	OS and PFS CD3⁺/CD4⁺ T-lymphocyte counts Safety/adverse events	• Patients receiving ≥ 6 cycles of SITOIGANAP: mOS 30.64 months, 1-year survival 90% • Peripheral CD3⁺/CD4⁺ cell counts positively correlated with OS (r = 0.89, $P = 0.0167$) • No treatment-related serious adverse events observed	[51]

Several publications from the Berd group report overlapping patient cohorts, reflecting serial immunologic and clinical analyses within a single clinical development program; therefore, patient numbers across individual studies should not be considered additive