

Table 2. Characteristics of included study

Study	Country	# of Patients	Treatment modalities	Median Follow up	Cancer type
Zhang 2018	China	162	Immunotherapy alone(n=118) Chemotherapy alone(n=44)	Not Reported	Mucosal melanoma (n=41) Cutaneous melanoma (n=121)
Namikawa 2018	Japan	30	2 immunotherapy agents (nivolumab + ipilimumab) every 3 weeks for four doses, followed by biweekly nivolumab	14.1 months (5.2-27.7)	Mucosal melanoma (n=12) Non-acral cutaneous (n=8) Acral cutaneous (n=7) Uveal (n=2) Unknown primary (n=1)
Maxwell 2018	USA	1	Surgery + Radiation +immunotherapy	Not applicable	Mucosal melanoma (n=1)
Theirauf 2018	Germany	21	Surgery (n=7) Surgery + radiation (n=9) Surgery + interferon (n=4) Chemotherapy (n=1)	51 months (2-202 moths)	Mucosal Melanoma (n=21)
Kiyohara 2018	Japan	610	Immunotherapy (n=610) Number of Previous therapy (not specified) 1 (n=205) 2 (n=116) 3 or more (n=197) unknown (n=162)	Not Specified	Cutaneous (n=389) Mucosal (n=208) Other (n=50) Unknown (n=34)
Tsui 2018	Not specified	1	Surgery + radiotherapy + immunotherapy	Not applicable	Mucosal melanoma (n=1)
Fujisawa 2017	Japan	60	Immunotherapy (n= 53) Radiotherapy + immunotherapy (n=7)	Not specified	Acral lentiginous (n=18) Mucosal (n=14) Nodular (n=12) Superficial spreading (n=8) Lentigo (n=2)

					Others/unknown (n=6)
Yamada 2017	Japan	38	Surgery (n=16) Surgery + immunotherapy (n=3) Surgery + chemotherapy + immunotherapy (n=9) Surgery + chemo (n=9) Surgery + chemoradiotherapy (n=1)	41.1 months (1-137 months)	Mucosal melanoma (n=38)
Liu 2017	China	51	Surgery (n=48) Radiotherapy (n=33) Chemotherapy (n=10) Immunotherapy (n=13)	59.0 months	Mucosal melanoma (n=51)
Kuo 2017	Toronto	17	Immunotherapy (n=17)	10.1 months (0.8-56.6)	Mucosal melanoma (n=17)
Shoushtari 2018	USA	81	Other modalities + Immunotherapy (n=20) Other modalities without immunotherapy (n=61)	10.3 (0.5 – 90.8)	Mucosal melanoma (n=81)
D'angelo 2017	USA	889	Immunotherapy (n=889)	7.4 (6.2-8.6)	Mucosal melanoma (n=86) Cutaneous melanoma (n=665)
Simeone 2016	Italy	42	Immunotherapy	5.6 months	Cutaneous Melanoma (n=40) Mucosal melanoma (n=2)
Schaefer 2017	USA	75	Surgery + immunotherapy (n=21) Surgery + immunotherapy + radiotherapy (n=5)	32 months (2-231 months)	Mucosal melanoma (n=75)
Jung 2017	Korea	104	Immunotherapy (n=104) Number of Previous therapy (not specified) 1 (n=41)	7.1 months (5.9-8.3 months)	Acral (n=33) Mucosal (n=27) Cutaneous (n=27)

			2 (n=34) 3 (n=29)		Uveal (n=10) Unknown (n=7)
Shoushtari 2016	USA	60	Immunotherapy (n=60) Previous systemic therapy (not specified) (n=51)	15.3 months	Acral (n=25) Mucosal(n=35)
Frakes 2015	USA	38	Immunotherapy (n=6) Other modalities (n=32)	Not specified	Mucosal (n=38)
Kirchoff 2016	USA	227	Surgery (n=53) Surgery + other modalities[immunotherapy inclusive] (n=149)	Not Specified	Mucosal (n=227)
Wu 2015	Taiwan	31	Immunotherapy + chemotherapy (n=31)	55 months (14.7-95.4 months)	Acral (n=11) Nodular (n=4) Superficial spreading (n=1) Mucosal (n=10) Other (n=5)
Bakkal 2015	Turkey	10	Surgery + chemoradiotherapy (n=4) Surgery + radiotherapy (n=5) Surgery + chemotherapy + immunotherapy (n=3)	Not specified	Mucosal (n=10)
Lian 2013	China	189	Surgery (n=63) Surgery + immunotherapy (n=63) Surgery + chemotherapy (n=63)	26.8 months (5.9-53.9 months)	Mucosal (n=189)
Alexander 2014	Australia	104	Immunotherapy (n=104)	7 months (0-30 months)	Cutaneous (n=79) Mucosal (n=8) Uveal (n=11)
Sun 2013	China	68	Immunotherapy (n=15) Chemotherapy (n=29) Multimodal treatment not specified (n=37) Radiotherapy (n=20)	Not specified	Mucosal (n=68)
Vecchio 2014	Italy	71	Previous treatments not specified: 1 (n=47) 2 (n=14) 3 or more (n=10)	21.8 months (1.0-32.7 months)	Mucosal (n=71)
Keller 2013	USA	73	Surgery (n=26)	27.5 months	Mucosal (n=73)

			Surgery + immunotherapy (n=7) Surgery + chemotherapy (n=22) Surgery + radiotherapy (n=18)	(0-183 months)	
Adenis 2013	UK	26	Previous treatment modalities (combinations not specified) n=26 Immunotherapy (n=26)	Not specified for all cancers	GIST (n=17) Chordoma (n=7) Mucosal (n=2)
Mun 2013	Korea	1	Surgery + immunotherapy + chemotherapy	Not applicable	Mucosal (n=1)
Sun 2012	China	51	Surgery + immunotherapy +/- chemotherapy (n=11) Other therapy [not specified] (n=40)	Not specified	Mucosal (n=51)
Wang 2012	China	61	Immunotherapy+chemotherapy + other unspecified (n=34) Surgery alone (n=13) Radiotherapy (n=17)	21.0 months (5-80 months)	Mucosal (n=61)
Saigal 2012	USA	17	Surgery alone (n=5) Surgery + immunotherapy + other modalities (n=7) Surgery + other modalities excluding immunotherapy (n=5)	35.2 months (5-225 months)	Mucosal (n=17)
Moreno 2010	USA	58	Immunotherapy + other modalities not specified (n=21)	Not specified	Mucosal (n=58)
Narasimhan 2009	USA	18	Surgery alone (n=8) Surgery + immunotherapy +/- other modalities not specified(n=8) Surgery + other modalities [excluding immunotherapy] (n=18)	Not specified	Mucosal (n=18)
Bedlikian 2008	USA	616	Chemo therapy +/- interferon (n=352) Biochemotherapy (n=264)	Not specified	Skin (n=497) Unknown primary (n=83) Mucosal (n=21) Uveal (n=15)
Krengli 2006	Italy	74	Surgery (n=17) Surgery + radiotherapy (n=42) Radiotherapy (n=11) Chemo-immunotherapy (n=4)	20 months (1-207 months)	Mucosal (n=74)

Garzino-Demo 2004	Italy	10	Surgery + immunotherapy + other modalities (n=8) Surgery + other modalities [excluding immunotherapy] (n=2)	Not specified	Mucosal (n=10)
Maxwell 2018	USA	20	Surgery + other modalities [excluding immunotherapy] (n=10) Surgery + chemotherapy + immunotherapy (n=10)	9.5 months (4-24 months)	Mucosal (n=21)
Hamid 2018	USA	1567	Immunotherapy + prior modalities not specified (n=1567)	Not specified	Mucosal (n=84) Non mucosal not specified (n=1483)
Sayed 2017	USA	72	Surgery + immunotherapy (n=17) Surgery + other modalities [excluding immunotherapy] (n=55)	Not specified	Mucosal (n=72)
Liu 2017	China	51	Immunotherapy +/- other modalities (n=13) Other modalities excluding immunotherapy (n=38)	59.0 months (11-123 months)	Mucosal (n=51)
Simeone 2017	Italy	42	Immunotherapy +/- other therapies (n=42)	5.6 months	Cutaneous (n=40) Mucosal (n=2)
Ascierto 2016	Italy	1	Immunotherapy	Not applicable	Mucosal (n=1)
Shoushtari 2016	USA	60	Immunotherapy + other modalities (n=51) Immunotherapy alone (n=9)	10.6 months	Mucosal (n=35) Acral (n=25)
Frakes 2015	USA	38	Immunotherapy + other modalities (n=6) Other modalities excluding immunotherapy (n=32)	58 months (7-118 months)	Mucosal (n=38)
Swegal 2014	USA	25	Immunotherapy + other modalities (n=6) Other modalities excluding immunotherapy (n=19)	20.4 months (2.4 - 172 months)	Mucosal (n=25)
Tajudeen 2014	USA	14	Immunotherapy + other modalities (n=1) Other modalities excluding immunotherapy (n=13)	Not specified	Mucosal (n=14)

Keller 2013	USA	73	Surgery + immunotherapy (n=22) Other modalities excluding immunotherapy (n=51)	27.5 months (0-183 months)	Mucosal (n=73)
Krengli 2006	Italy	74	Immunotherapy with chemotherapy (n=4) Other modalities excluding immunotherapy (n=70)	20 months	Mucosal (n=74)
Wada 2004	Japan	31	Immunotherapy +/- other modalities (n=11)	16 months (1-214 months)	Mucosal (n=31)
Owens 2003	USA	48	Biochemotherapy +/- immunotherapy (n=12) Other modalities (n=36)	Not specified	Mucosal (n=48)
Stern 1991	USA	42	Immunotherapy +/- chemotherapy (n=29) Other modalities excluding immunotherapy (n=13)	46 months	Mucosal (n=42)
Kim 2016	Korea	27	Immunotherapy +/- other modalities (n=28)	32.1 months (24.9- 39.1months)	Acral (n=10) Mucosal (n=9) Cutaneous (n=8)
Liao 2014	USA	14	Immunotherapy with other modalities (n=1) Other modalities excluding immunotherapy (n=13)	49 months	Mucosal (n=14)