IV Simposio

GETHI

Monográfico de Tumores cutáneos infrecuentes

Nuevos fármacos e inmunoterapia en tumores cutáneos infrecuentes

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Organizado por: Grupo Gethi – Grupo Español de Tumores Huérfanos e Infrecuentes

CENTRO INTEGRAL ONCOLÓGICO hm CIOCC

Disclosures

- Advisory boards and Consulting for BMS, Amgen, BioClin
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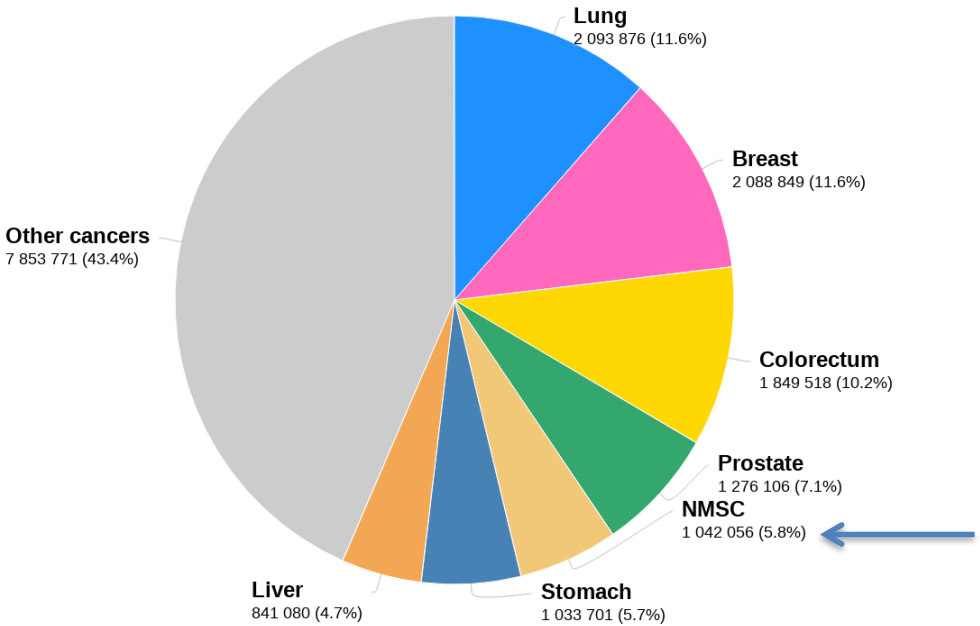
Estimated number of new cases in 2018, worldwide, all cancers, both sexes, all ages

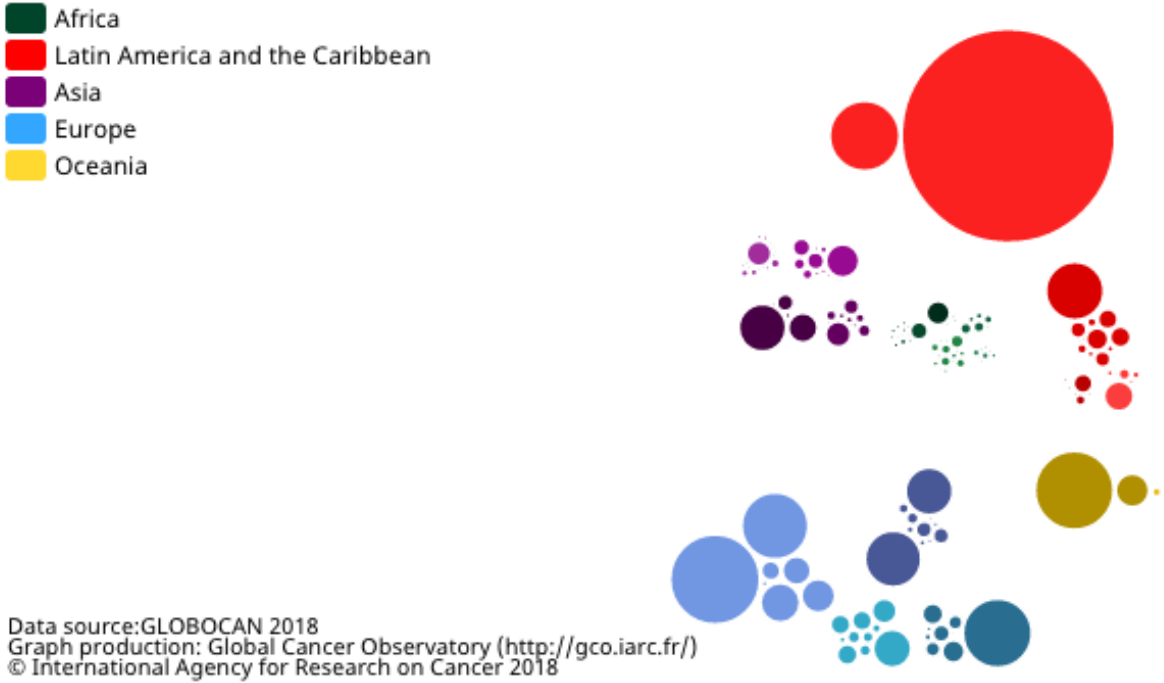


Total : 18 078 957

Data source: Globocan 2018
Graph production: Global Cancer Observatory (http://gco.iarc.fr)

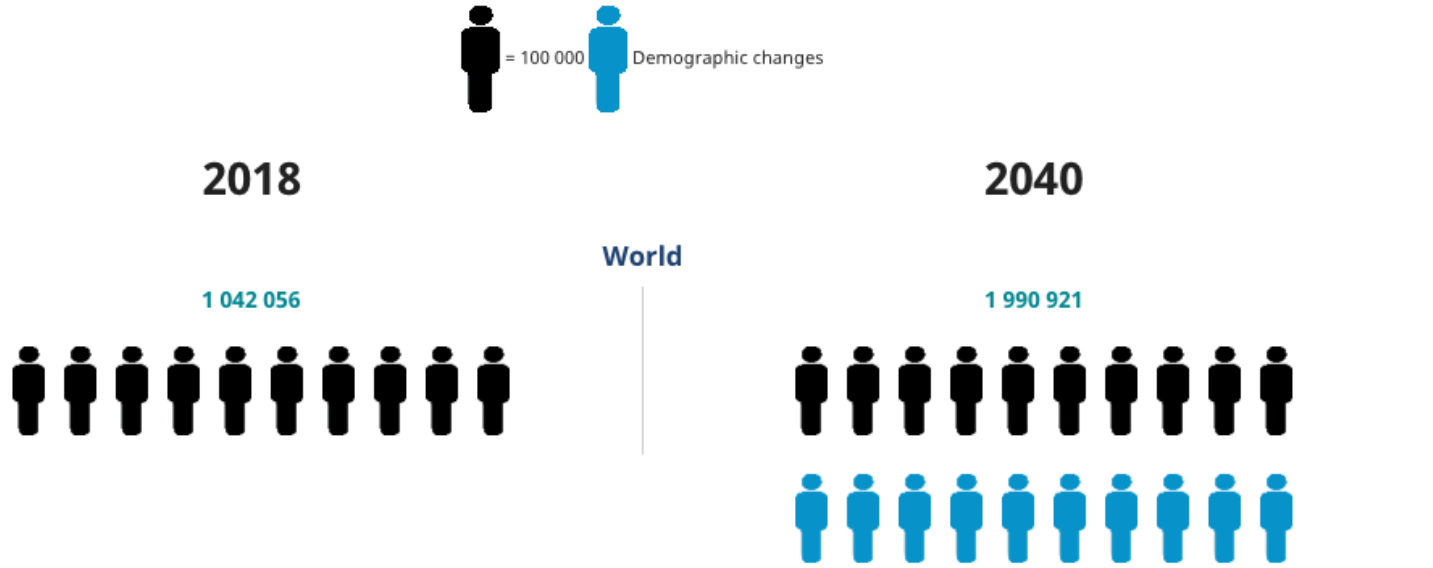
International Agency for Research on Cancer
World Health Organization

Estimated number of new cases in 2018, non-melanoma skin cancer, both sexes, all ages



Data source:GLOBOCAN 2018
Graph production: Global Cancer Observatory (http://gco.iarc.fr/)

Estimated number of incident cases from 2018 to 2040, non-melanoma skin cancer, both sexes, all ages



Data source:GLOBOCAN 2018
Graph production: Global Cancer Observatory (http://gco.iarc.fr/)

International Agency for Research on Cancer
World Health Organization

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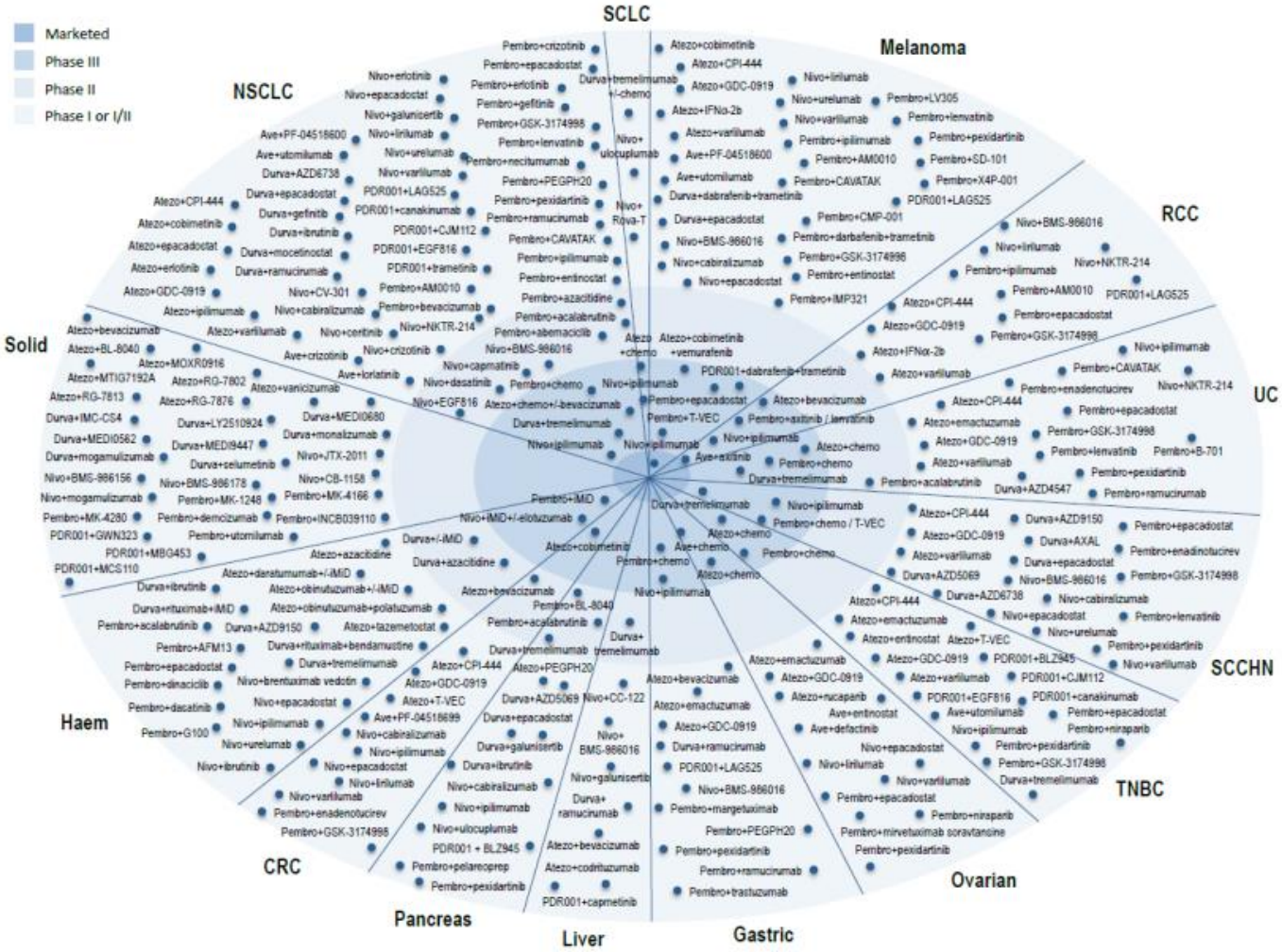

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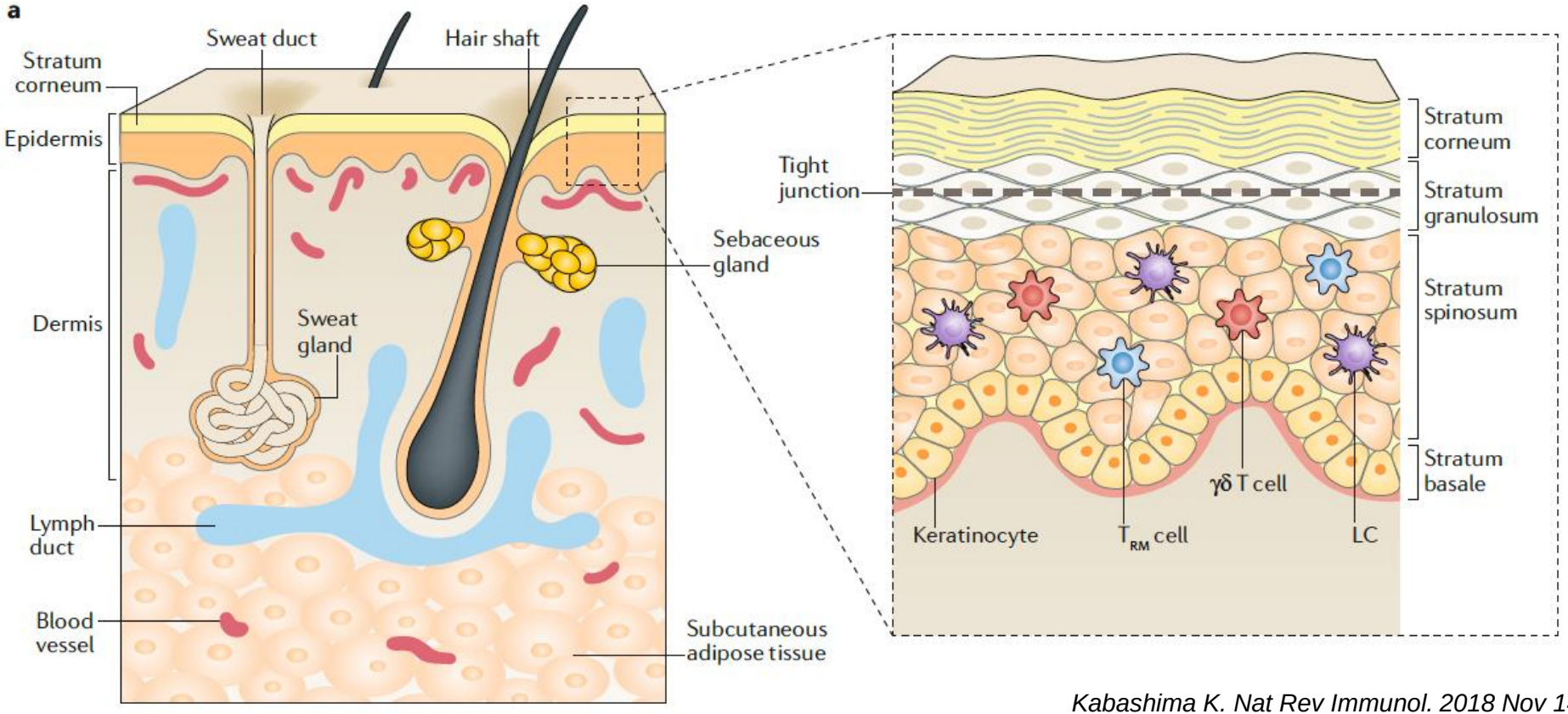

Kabashima K. Nat Rev Immunol. 2018 Nov 14

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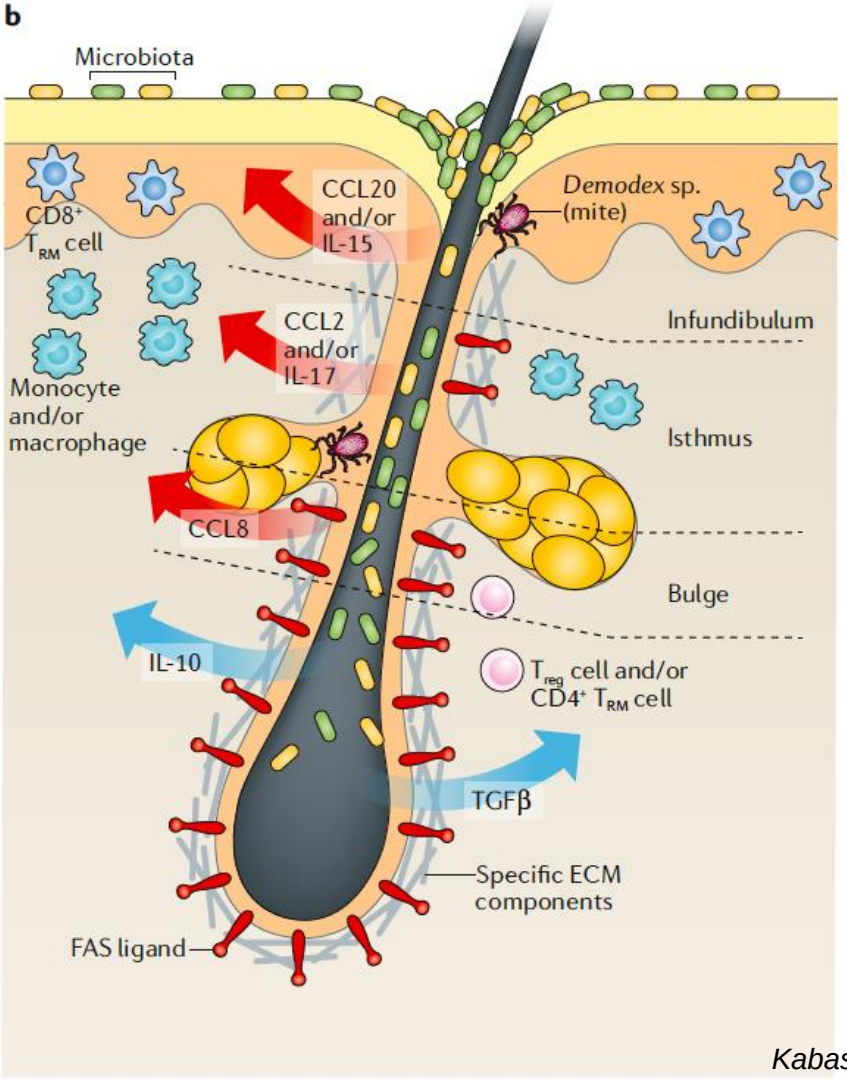

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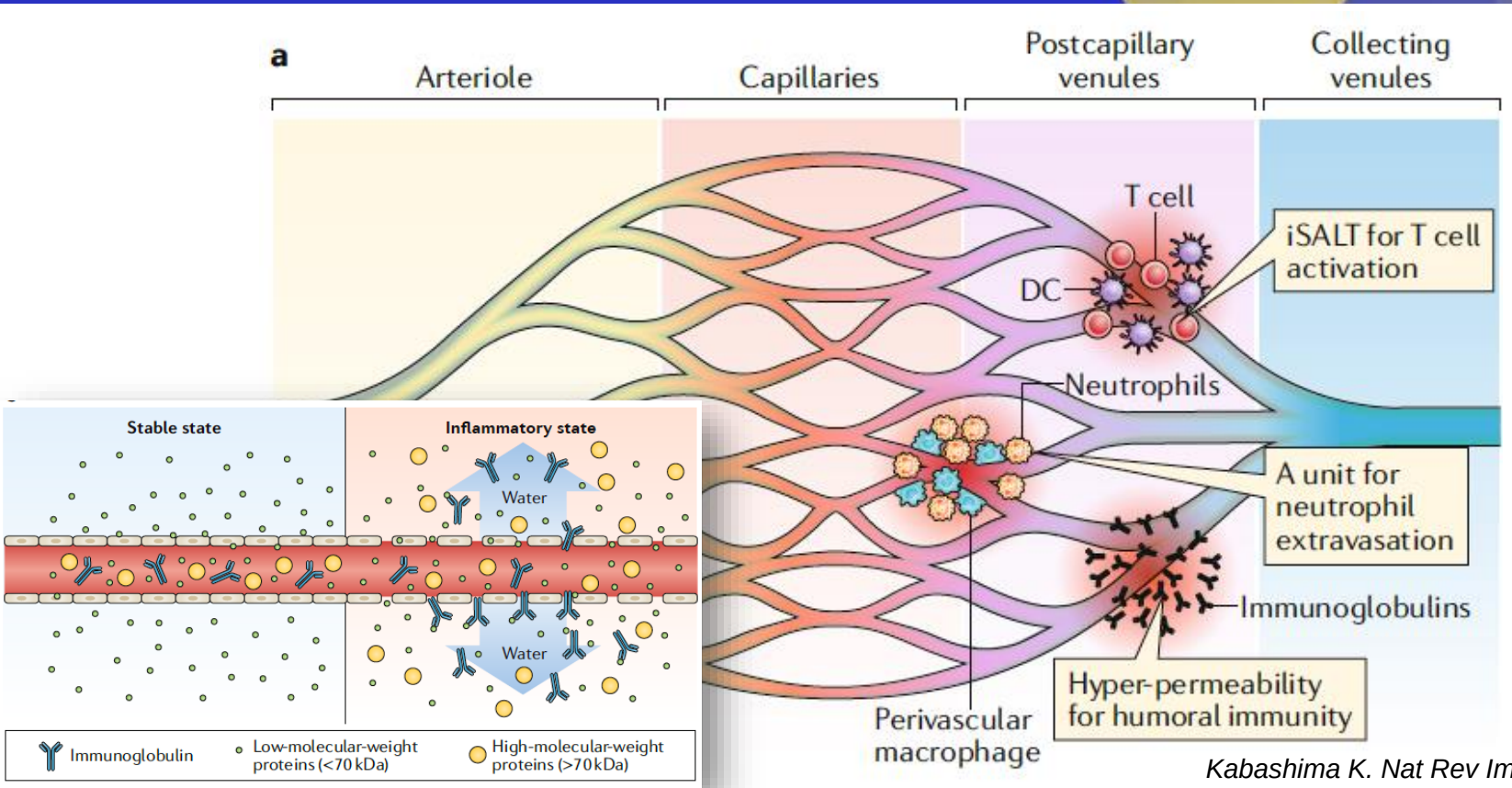
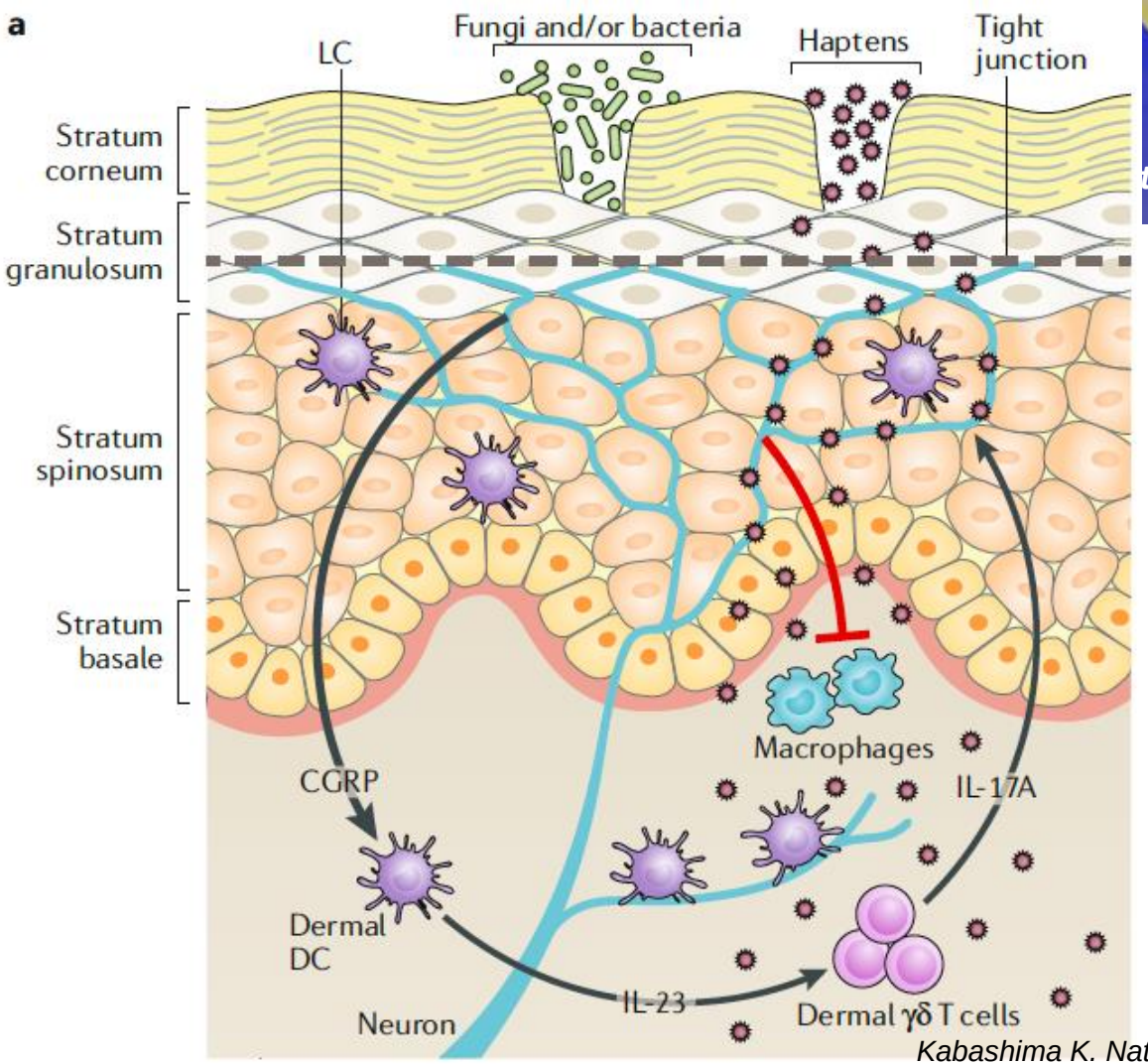
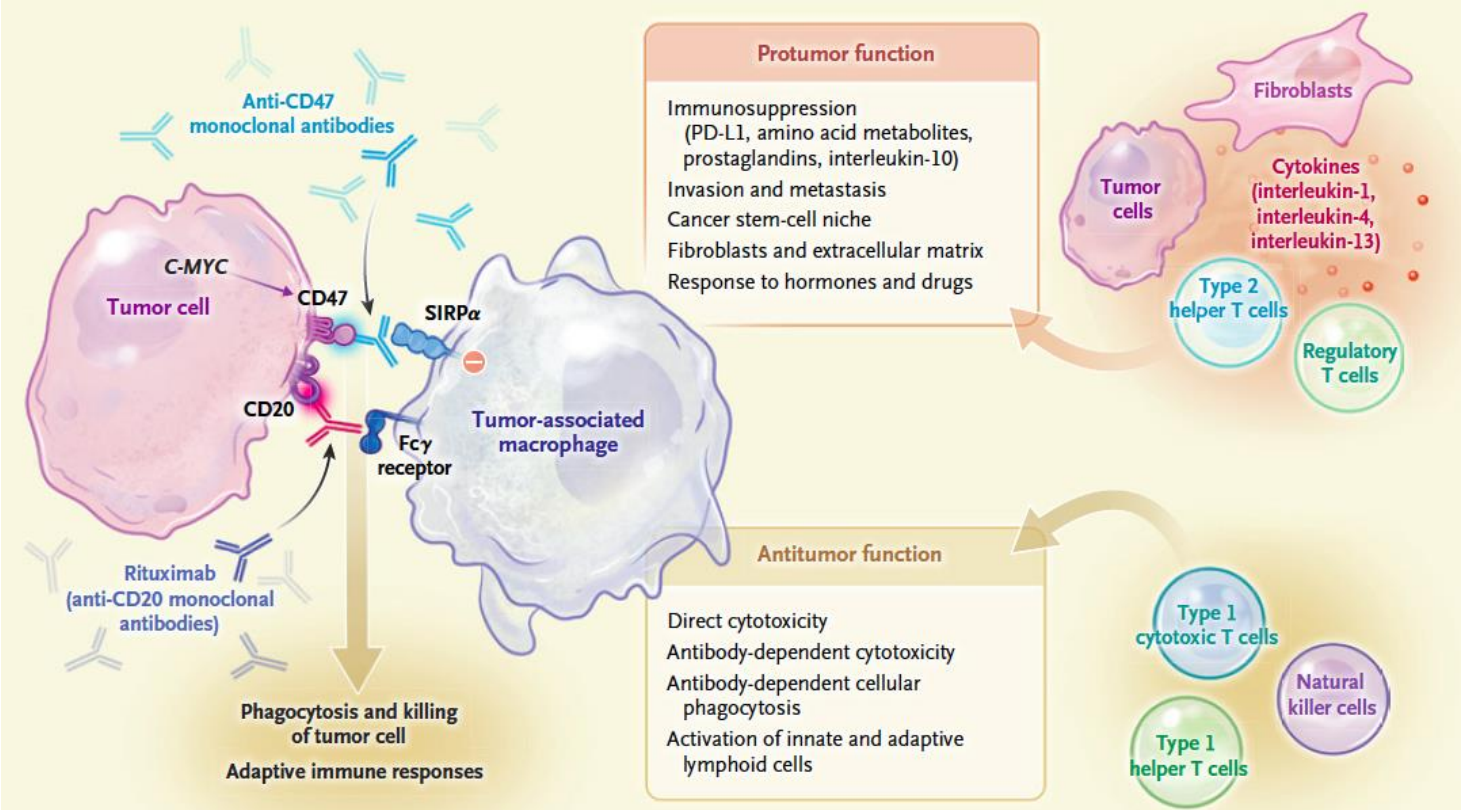


Kabashima K. Nat Rev Immunol. 2018 Nov 14



Kabashima K. Nat Rev Immunol. 2018 Nov 14

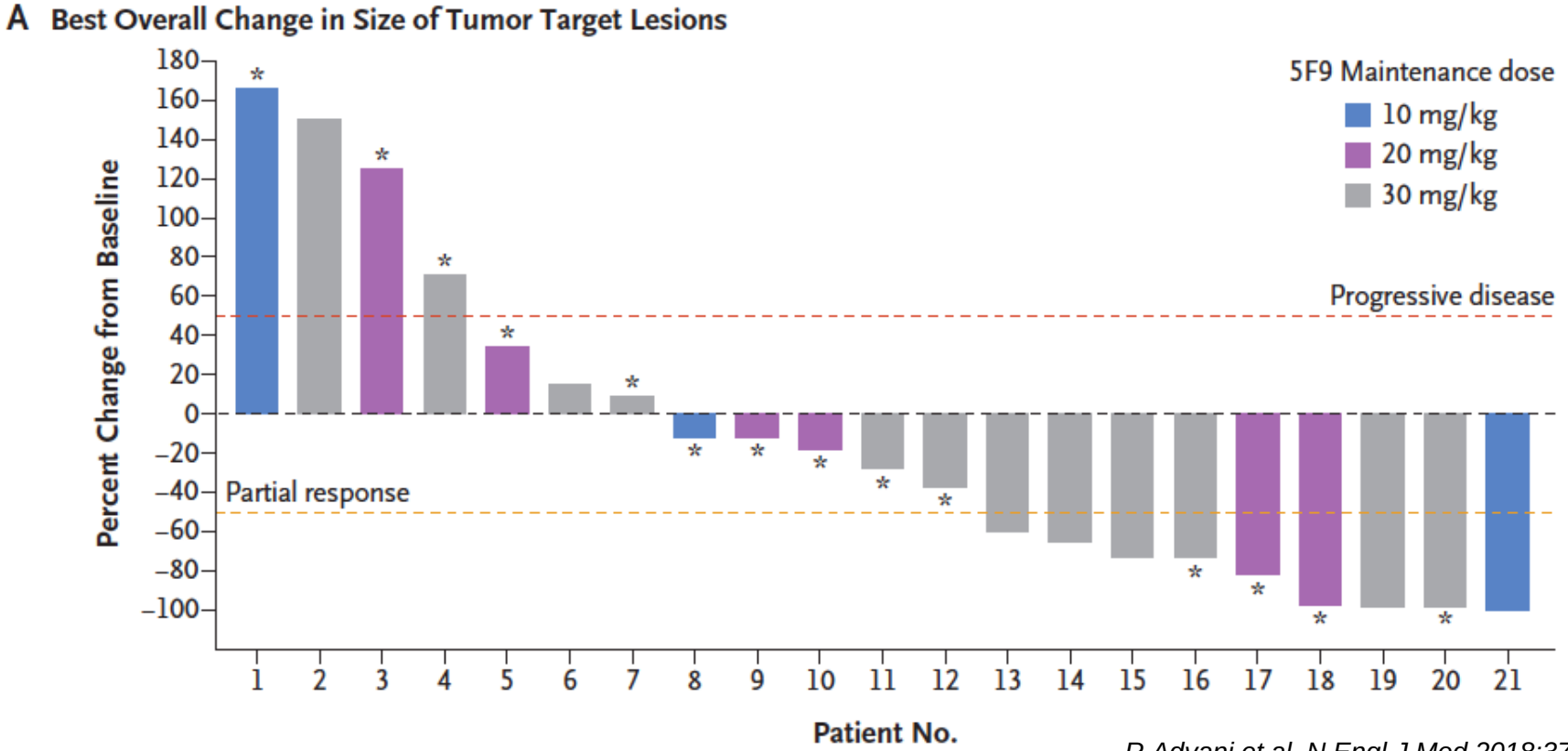


A Mantovani. N Engl J Med 2018; 379: 1711-21

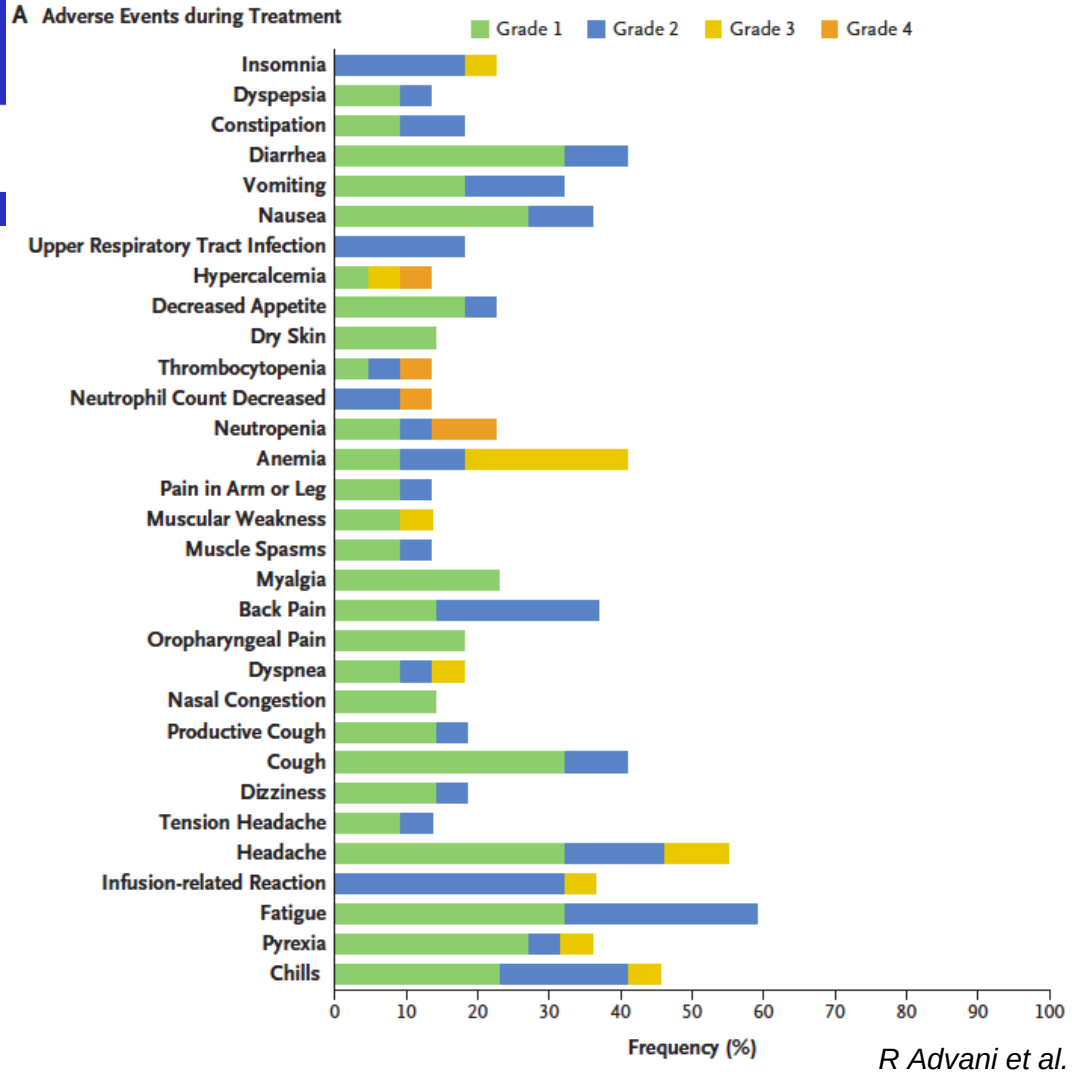
ORIGINAL ARTICLE

CD47 Blockade by Hu5F9-G4 and Rituximab in Non-Hodgkin's Lymphoma

R Advani et al. N Engl J Med 2018;379:1711-21.



R Advani et al. N Engl J Med 2018;379:1711-21.



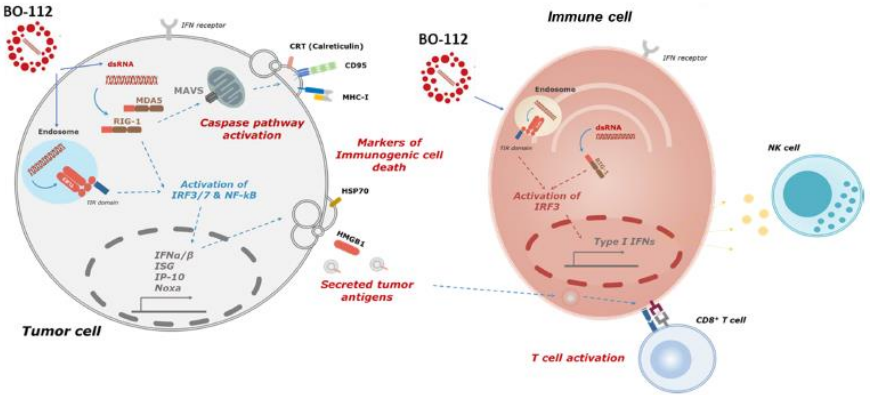
R Advani et al. N Engl J Med 2018;379:1711-21.

Improving the Priming

** NCT02978625: A Phase II Study of Talimogene Laherparepvec Followed by Talimogene Laherparepvec + Nivolumab in Refractory T Cell and NK Cell Lymphomas, Cutaneous Squamous Cell Carcinoma, Merkel Cell Carcinoma, and Other Rare Skin Tumors.

** BO-112

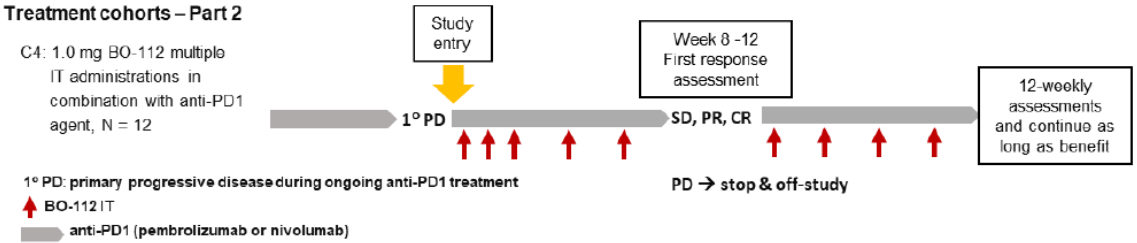
Figure 1: BO-112 mechanism of action



www.clinicaltrials.gov

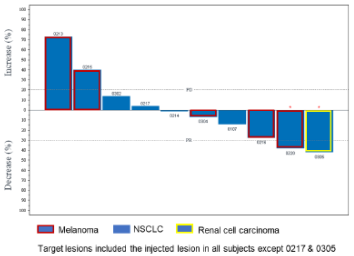
I Marquez-Rodas et al. Abstract LBA39. ESMO 2018

INTRATUMORAL BO-112, A DOUBLE-STRANDED RNA (dsRNA), ALONE AND IN COMBINATION WITH SYSTEMIC ANTI-PD-1 IN SOLID TUMORS

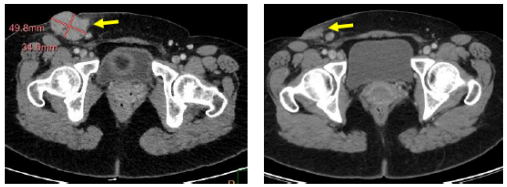


RESULTS: RECIST 1.1 FROM COHORT 4 AND PATIENT EXAMPLE

Figure 4: Change in sum of target lesions at 1st scheduled assessment from baseline (RECIST v1.1)



Target lesions included the injected lesion in all subjects except 0217 & 0305



Pre BO-112 6-JUN-2018

Post BO-112+nivolumab 18-AUG-2018

Fig 5: patient 0220: female 48y, melanoma resistant to nivolumab. Arrow indicates the lesion injected with BO-112

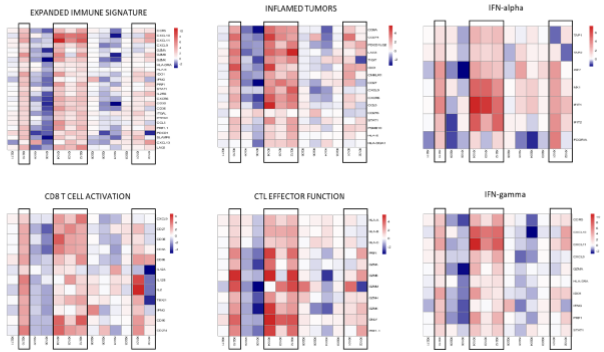
Preliminary disease control rate at 1st assessment (8-12 weeks) was 7/12 (58%) and objective response rate 2/12 (17%), one PR in melanoma and one PR in renal cancer.

RESULTS: IMMUNOBIOLOGICAL EFFECTS COHORTS 1-3

Table 2 – Cohorts 1 - 3

Increases in circulating immune cells	Number of patients N = 16 (%)
Lymphocytes	9 (56)
CD8+ T cells	8 (50)
CD4+ T cells (excl. regulatory T cells)	11 (69)
CD4+ regulatory T cells	14 (88)
NK cells	10 (63)
Monocytes	7 (44)
B cells	11 (69)
Dendritic cells	7 (44)
Tumor biopsy	**Number of patients N = 16**
Increased apoptosis	10 (63)
Increased necrosis	5 (31)
Increased CD8+	3 (19)
Increased CD4+	6 (38)

Figure 4: Cohorts 1 – 3 Nanostring analysis[a]



I Marquez-Rodas et al. Abstract LBA39. ESMO 2018

CELL Therapy beyond TIL

Effect of a combined treatment with iPS cells derived dendritic cells and proton beam irradiation in a murine subcutaneous melanoma model:

* Proton beam therapy induced superior immunogenicity of cancer cell comparing to X-ray therapy
* iPS-DCs showed an excellent ability to incorporate antigens in vitro comparing to BM-DCs
* The combination treatment of proton beam and iPS-DCs significantly delayed tumor growth in vivo

Y Wang. Annals of Oncology (2018) 29 (suppl_8): viii649-viii669. 10.1093/annonc/mdy303

"Clasic" Checkpoint Inhibitors

* Cemiplimab

D Rischin et al. ASCO 2018

IV Simposio GETHI | Monográfico de Tumores cutáneos infrecuentes

9519

Primary Analysis of Phase 2 Results for Cemiplimab, a Human Monoclonal Anti-PD-1, in Patients with Metastatic Cutaneous Squamous Cell Carcinoma

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Background

- Cutaneous squamous cell carcinoma (CSCC) is rivalled in incidence only by basal cell carcinoma as the most common cancer in the US.[1]
- Risk factors for CSCC include chronic sun exposure, advanced age, ultraviolet radiation-sensitive skin, and immunosuppression.[2]
- More than 95% of CSCC patients are cured with surgery; however, due to the very high incidence of the disease, an estimated 3,932–8,791 patients died from CSCC in 2012 in the US.[3,4]
- There is no approved systemic therapy for patients with advanced CSCC (locally advanced CSCC that is no longer amenable to surgery or radiation therapy, and metastatic CSCC).
- Cemiplimab (REGN2810) is a high-affinity, highly potent, human, hinge-stabilized IgG4 monoclonal antibody, generated using VelocImmune® technology,[5,6] directed against programmed death-1 (PD-1) receptor blocking the interactions of PD-1 with PD-ligand 1 (PD-L1) and PD-L2.[7]
- Cemiplimab treatment demonstrated encouraging preliminary activity in the CSCC expansion cohorts of the first-in-human study.[8]
  - Updates on the Phase 1 CSCC expansion cohorts are presented in a separate poster at this meeting (see abstract #9557 [poster #384]).
- Here we present the primary analysis of the metastatic CSCC cohort from the Phase 2 study of cemiplimab in patients with advanced CSCC (NCT02760498).

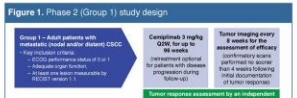
Objectives

- The primary objective was to evaluate overall response rate (ORR; complete response + partial response) according to independent central review per Response Evaluation Criteria In Solid Tumors (RECIST) 1.1[9] (for scans) and modified World Health Organization criteria (for photos).
- Secondary objectives include:
  - Estimation of duration of response, durable disease control rate (DCR), progression-free survival (PFS), and overall survival (OS)
  - Assessment of safety and tolerability of cemiplimab.

Methods

- Patients with metastatic CSCC from Group 1 of the Phase 2, non-randomized, global, pivotal trial of cemiplimab in patients with advanced CSCC are included in this analysis (**Figure 1**).

Figure 1. Phase 2 (Group 1) study design



ECOG, Eastern Cooperative Oncology Group; Q2W, every 2 weeks

- Key exclusion criteria:
  - Ongoing or recent (within 5 years) autoimmune disease requiring systemic immunosuppression
  - Prior treatments with anti-PD-1 or anti-PD-L1 therapy
  - History of solid organ transplant, concurrent malignancies (unless indolent or not considered life threatening; for example, basal cell carcinoma), or hematologic malignancies.
- Severity of treatment-emergent adverse events (TEAEs) was graded according to the National Cancer Institute Common Terminology Criteria for Adverse Events (version 4.03).
- The data cut-off date for this analysis was October 27, 2017.

Results

Baseline characteristics, disposition, and treatment exposure

- Of the 59 patients enrolled, 35 (59.3%) remained on treatment at the time of data cut-off, 24 (40.7%) have discontinued treatment mainly due to disease progression (n=14; 23.7%) and adverse events (AEs) (n=4; 6.8%).
- The median duration of exposure to cemiplimab was 32.7 weeks (range: 2.0–69.3) and the median number of doses administered was 17 (range: 1–35).
- The median duration of follow-up at the time of data cut-off was 7.9 months (range: 1.1–15.6).

Table 1. Patient demographics and baseline characteristics

	Metastatic CSCC (N = 59)
Median age, years (range)	71 (38–93)
≥ 65 years, n (%)	43 (72.9)
Male sex, n (%)	54 (91.5)
ECOG performance status, n (%)	
0	23 (39.0)
1	36 (61.0)
Primary CSCC site, n (%)	
Head/neck[1]	38 (64.4)
Extremity[2]	12 (20.3)
Trunk	9 (15.3)
Prior systemic therapy for CSCC, n (%)	33 (55.9)
Prior radiotherapy for CSCC, n (%)	50 (84.7)

[1]Includes ear and temple. [2]Includes arm/hands and legs/feet.

Clinical efficacy

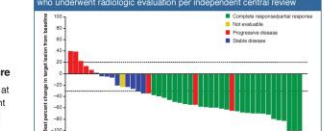
- Rapid, deep, and durable target lesion reductions were observed in most patients who had at least one tumor assessment on treatment (**Figures 2–4**).

Table 2. Tumor response assessment by independent central review

	Metastatic CSCC (N = 59)
Best overall response, n (%)	
Complete response	4 (6.8)
Partial response	24 (40.7)
Stable disease	9 (15.3)
Non-complete response/ non-progressive disease[1]	4 (6.8)
Progressive disease	11 (18.6)
Not evaluable[2]	7 (11.9)
Overall response rate, % (95% CI)	**47.5 (34.3–60.9)**
Durable disease control rate, % (95% CI)[3]	**61.0 (47.4–73.5)**
Median observed time to response, months (range)[3]	1.9 (1.7–6.0)

[1]Patients with non-measurable disease on central review of baseline imaging. [2]Includes missing and unknown tumor response. [3]Defined as the proportion of patients without progressive disease for at least 105 days. [4]Data shown are from patients with confirmed complete or partial response; n = 28.
CI, confidence interval

Figure 2. Clinical activity of tumor response to cemiplimab in patients who underwent radiologic evaluation per independent central review



Plot shows the best percentage change in the sum of target lesion diameters from baseline for 45 patients who underwent radiologic evaluation per independent central review after treatment initiation. Lesion measurements after progression were excluded. Horizontal dotted lines indicate criteria for partial response (≥30% decrease in the sum of target lesion diameters) and progressive disease (≥20% increase in the target lesion diameters). Three patients with target lesion reductions ≥30% were classified as progressive disease (not being due to new lesion or progression of non-target lesion. The following patients do not appear in the figure (but are included in the ORR analysis [Table 2], per intention-to-treat): three patients with progression of non-target lesions or new lesion (but no evaluable target lesion); one patient with complete response who had only non-target lesions at baseline; four patients with best response of non-complete response/non-progressive disease; and six patients with no evaluable post-treatment tumor assessments. One patient had stable disease per RECIST 1.1 but was not evaluable (yellow bar) due to externally visible disease that was not evaluable on photographic assessments.

Figure 3. Change in target lesion over time

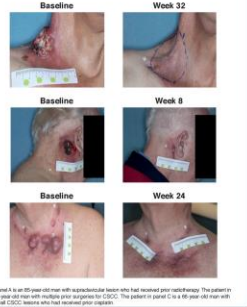
Plot shows the percent change in target lesion diameters from baseline over time. Patients shown on this figure are the same as those on Figure 2. Horizontal dotted lines indicate criteria for partial response (≥30% decrease in the sum of target lesion diameters) and progressive disease (≥20% increase in the target lesion diameters).

Figure 4. Time to and duration of response in responding patients

Plot shows time to response and duration of response in the 28 responding patients. Each horizontal line represents one patient. Twenty-three of the 28 patients remain in response and on study at time of data cut-off. Three patients had disease progression (red asterisks); one patient was censored after surgical resection of responding target lesion (top line); and one was lost to follow-up after experiencing complete response (second-from-top line).

- Median duration of response had not been reached at data cut-off.
- Neither median PFS nor median OS had been reached at data cut-off.
  - The estimated progression-free probability at 12 months was 52.5% (95% CI: 37.0–65.8).
  - The estimated probability of survival at 12 months was 80.6% (95% CI: 67.7–88.8).

Figure 5. Examples of reductions in visible CSCC lesions following treatment with cemiplimab



The patient in panel A is an 85-year-old man with supraclavicular lesion who had received prior radiotherapy. The patient in panel B is an 85-year-old man with multiple prior surgeries for CSCC. The patient in panel C is a 46 year-old man with anterior chest wall CSCC lesions who had received prior cisplatin.

- Responses to cemiplimab were observed irrespective of prior systemic therapy.
  - ORR in patients without prior systemic anticancer therapy was 57.7% (15/26 patients; 95% CI: 36.9–76.6; three CRs and 12 PRs); durable DCR was 69.2% (95% CI: 48.2–85.7).
  - ORR in patients who had received prior systemic anticancer therapy was 39.4% (13/33 patients; 95% CI: 22.9–57.9; one CR and 12 PRs); durable DCR was 54.5% (95% CI: 36.4–71.9).

Treatment-emergent adverse events

- TEAEs regardless of attribution are summarized in **Table 3**.

Table 3. TEAEs regardless of attribution

TEAEs	Metastatic CSCC (N = 59)	
n (%)	Any grade	Grade ≥3
Any	59 (100.0)	25 (42.4)
Serious	21 (35.6)	17 (28.8)
Led to discontinuation	4 (6.8)	3 (5.1)
With an outcome of death	3 (5.1)	3 (5.1)
Occurred in at least five patients'		
Diarrhea	16 (27.1)	1 (1.7)
Fatigue	14 (23.7)	1 (1.7)
Nausea	10 (16.9)	0
Constipation	9 (15.3)	1 (1.7)
Rash	9 (15.3)	0
Cough	8 (13.6)	0
Decreased appetite	8 (13.6)	0
Pruritus	8 (13.6)	0
Headache	8 (13.6)	0
Dry skin	6 (10.2)	0
Maculo-papular rash	6 (10.2)	0
Vomiting	6 (10.2)	0
Anemia	5 (8.5)	1 (1.7)
Hypothyroidism	5 (8.5)	0
Increased alanine aminotransferase	5 (8.5)	0
Pneumonitis	5 (8.5)	2 (3.4)

[1]Events are listed as indicated on the case report form. Adverse events were coded according to Preferred Terms (MedDRA version 20.0). Although rash and maculopapular rash may reflect the same condition, they were listed as two different events in the safety report. Included in this table are TEAEs of any grade that occurred in ≥5 patients. Events are listed in decreasing order of frequency by any grade.

- Grade ≥3 TEAEs that occurred in more than one patient were cellulitis, pneumonitis, hypercalcemia, death, and pleural effusion.
- Investigator-assessed treatment-related TEAEs of any grade occurred in 44 patients (74.6%), with seven patients (11.9%) experiencing grade ≥3 treatment-related TEAEs.
- A total of nine grade ≥3 immune-related TEAEs (per investigator assessment) occurred in six patients (10.2%) as follows:
  - Pneumonitis (3.4%), and arthritis, aseptic meningitis, colitis with diarrhea, confusional state, hypophysitis, neck pain, and polyarthritis (each 1.7%).
- Four patients (6.8%) discontinued treatment due to treatment-related TEAEs, with three patients (5.1%) discontinuing due to grade ≥3 treatment-related TEAEs.
- The most common treatment-related TEAEs were fatigue (13.6%), diarrhea (11.9%), and pruritus, rash, and maculopapular rash (each 10.2%).
- Pneumonitis was the only grade ≥3 treatment-related TEAE to occur in more than one patient.
- Three patients (5.1%) had TEAEs with outcome of death; however, none were considered related to treatment.
  - A 93-year-old man presented with fever and cough with purulent sputum, and died of complications of pneumonia.
  - A 72-year-old man died in his sleep.
  - A 90-year-old man who had disease progression (per independent review) developed duodenal ulcer and esophagitis that later resolved. The patient subsequently experienced hypercalcemia and deep vein thrombosis and died.

Conclusions

- In the largest prospective study reported in patients with metastatic CSCC, cemiplimab 3 mg/kg Q2W showed substantial activity and durable responses with an acceptable safety profile.
- Cemiplimab showed an acceptable risk/benefit profile in this metastatic CSCC population, which tends to be elderly and associated with medical co-morbidities.
- Combined with the updated CSCC expansion cohorts of the Phase 1 results (see abstract #9557 [poster #384]), these results indicate that advanced CSCC tumors, whether metastatic or locally advanced, are responsive to cemiplimab.
- Evaluation of cemiplimab 3 mg/kg Q2W in patients with locally advanced CSCC in the Phase 2 study of cemiplimab is ongoing.

These results in combination with the Phase 1 results (abstract #9557 [poster #384]) are now published and available at http://NEJM.org (see Migden & Rischin et al. NEJM. 2018).

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Acknowledgments

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For any questions regarding this poster presentation, please contact Danny.Rischin@petermac.org.

Poster presented at the 2018 American Society of Clinical Oncology Annual Meeting, June 1–5, Chicago, Illinois.

"Clasic" Checkpoint Inhibitors

* *Biomarkers?*

JC Park et al. Abstract 9564. ASCO2018

HARVARD MEDICAL SCHOOL

Immune checkpoint inhibition (ICI) in advanced cutaneous squamous cell carcinoma (cSCC): Clinical response and correlative biomarker analysis

Jong Chul Park[1], Lori J Wirth[1], Keith T Flaherty[1], Donald P Lawrence[1], Shadmehr Demehri[1], Stefan Kraft[2], Ruth K Foreman[1], John R Clark[1], Justine V Cohen[1], Yuhree Kim[1], Genevieve M Boland[1], Dennie T Frederick[1], Ryan J Sullivan[1]
1. Massachusetts General Hospital, Boston, MA; 2. Center for Dermatopathology, Freiburg, Germany

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Results

Baseline Characteristics

Pt #	Sex	Age	Race	Underlying condition	Primary site	Previous systemic Tx	Anti-PD agent
1	M	62	W	None	Arm	Carbo, 5-FU	Nivolumab
2	M	79	W	CLL	Head/Neck	Carbo, 5-FU, Cetuximab	Pembrolizumab
3	M	88	W	CLL	Head/Neck	Cetuximab	Pembrolizumab
4	F	91	W	None	Arm	Carbo, Cetuximab	Pembrolizumab
5	F	61	W	None	Head/Neck	Carbo, 5-FU, Cetuximab	Nivolumab
6	M	74	W	None	Head/Neck	Carbo, Taxol, Cetuximab	Nivolumab
7	M	69	W	CLL	Head/Neck	None	Nivolumab
8	M	19	H	Xeroderma pigmentosum	Head/Neck	Carbo, Taxol, Cetuximab	Pembrolizuma
9	F	19	W	Xeroderma pigmentosum	Head/Neck Arm	None	Pembrolizumab
10	M	78	W	None	Head/Neck	None	Nivolumab
11	M	51	H	Marjolin's ulcer	Arm	Cisplatin, Pemetrexed	Pembrolizumab
12	F	75	W	Marjolin's ulcer	Leg	None	Pembrolizumab
13	M	83	W	None	Head/Neck	None	Pembrolizumab

M, male; F, female; W, white; H, Hispanic, Carbo, carboplatin; CLL, chronic lymphocytic leukemia

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Harvard Medical School

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MGH 1811 Massachusetts General Hospital

Treatment Responses (N=13)		
Best response	N (%)	Anti-PD-1 Ab
CR	2 (15%)	Nivo 2
PR	5 (39%)	Nivo 1, Pembro 4
ORR (CR+PR)	7 (54%)	
SD > 6 mo	4 (31%)	Nivo 2, Pembro 2
PD	2 (15%)	Pembro 2
Median time to response		10.5 weeks (6.3 – 15.0)
Est 12-month PFS		68.4% (95% CI 35.9-86.8)
Est 12-month OS		83.3% (95% CI 48.2-95.6)

Safety Profile		
Grade 3/4 irAE (2 discontinued therapy)	3 (23%)	Colitis Dermatitis Hepatitis
Grade 5 AE	1 (1%)	Myocarditis

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PD-L1 expression and immune cell composition in tumor microenvironment (N=11)

	PD-L1*		CD8		CD4		FoxP3	
Location	Tumor Cells	Immune Cells	Tumor Nest	Invasive Margin	Tumor Nest	Invasive Margin	Tumor Nest	Invasive Margin
Expression All pts, n=11	+ 5 (45%) Mean 6.3%	+ 8 (73%) Mean 5.6%	High 7 (64%) Low 4 (36%)	High 8 (73%) Low 3 (27%)	High 7 (64%) Low 4 (36%)	High 11 (100%) Low 0 (0%)	High 3 (27%) Low 8 (73%)	High 5 (45%) Low 6 (55%)
Responders Non-responders	+ 4/6 (67%) + 1/5 (20%)	+ 4/6 (67%) + 4/5 (80%)	High 5/6 (83%) High 2/5 (40%)	High 5/6 (83%) High 3/5 (60%)	High 4/6 (67%) High 3/5 (60%)	High 6/6 (100%) High 5/5 (100%)	High 2/6 (33%) High 1/5 (20%)	High 1/6 (17%) High 4/5 (80%)
P value**	0.242	1.000	0.242	0.545	1.000		1.000	0.080

*Defined as PD-L1 expression > 1% cells, **Fisher's Exact test was used to assess correlation between each immune parameter and response to PD-1 therapy

- Non-significant trend between tumor cell PD-L1, high CD8 T cell infiltrate in tumor nest and low FoxP3 infiltrate in invasive margin with response were observed
- Tumor cell PD-L1 expression was significantly correlated with high CD8 T cell in tumor nest (P=0.022) and showed a trend with high CD4 T cell in tumor nest (P=0.303)

A and B. Strong and modest PD-L1 expression on tumor and immune cells in contact with CD8 T cells in pt #8 and #3 who had PR and SD, respectively
C. Absence of PD-L1 expression in tumor cells and modest CD8 T cells in invasive margin suggesting immune exclusion in pt #13 with primary resistance

"Cell Signaling anti-PD-L1 (E1L3N®) XP® Rabbit mAb and Ventana CONFIRM anti-CD8 (SP57) Rabbit mAb were used for PD-L1 and CD8 staining, respectively

Genetic Alteration (N=6)

Pt #	Response	Altered genes
1	PR	TP53, BRCA2, PIK3CA, ATM, RB1, PDGFRA, SMARCA4, PTCH1, NF1, MAP3K1, PIK3R1, SMO, CCND2, TSC2
3	SD	TP53, TERT, CKN2A, NF1, RHOA, EZH2, MEN1, KRAS, STK11
8	PR	TP53, BRCA2, TERT, CDKN2A, ATM, RB1, FOXL2, PDGFRA, SMARCA4, PTCH1, NF1, NF2, GNAS, DDR2, MLH1, ERBB4, MYCN, APC, KDR, EGFR, ROS1, GNAQ, JAK2, FGFR1, STAG2, RET, HNF1A, ERBB2, BRCA1, CDH1, CCNE1
10	PR	TP53, PIK3CA, FOXL2
11	PR	TP53, BRCA2, TERT, CDKN2A, TSC1, IDH2
13	PD	TP53, PTEN

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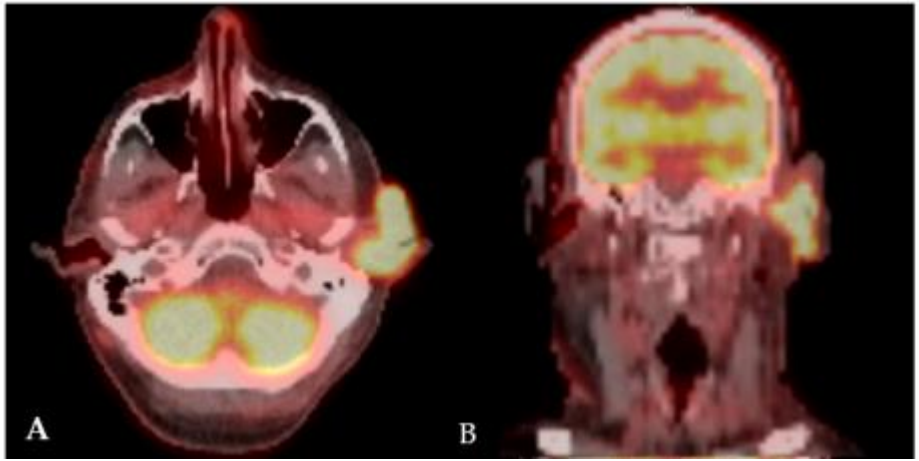
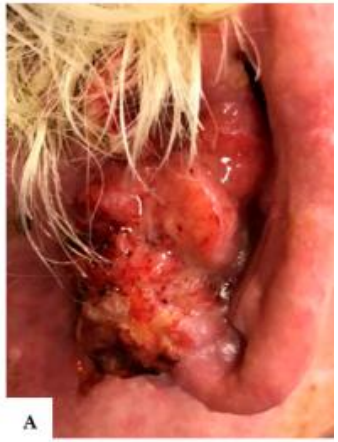
CSCC treated with Nivolumab and Cetuximab (Case Report)





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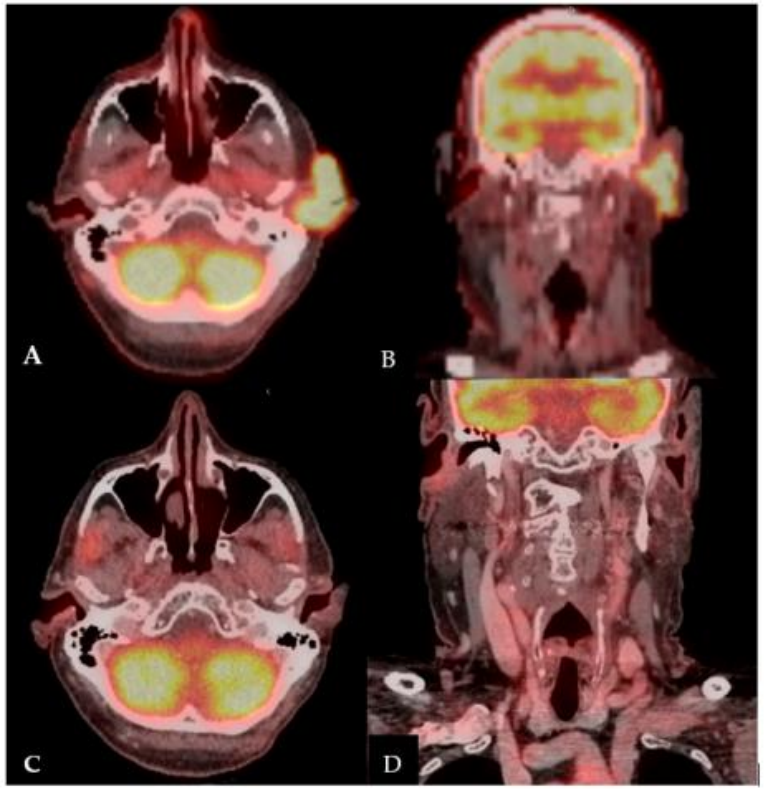

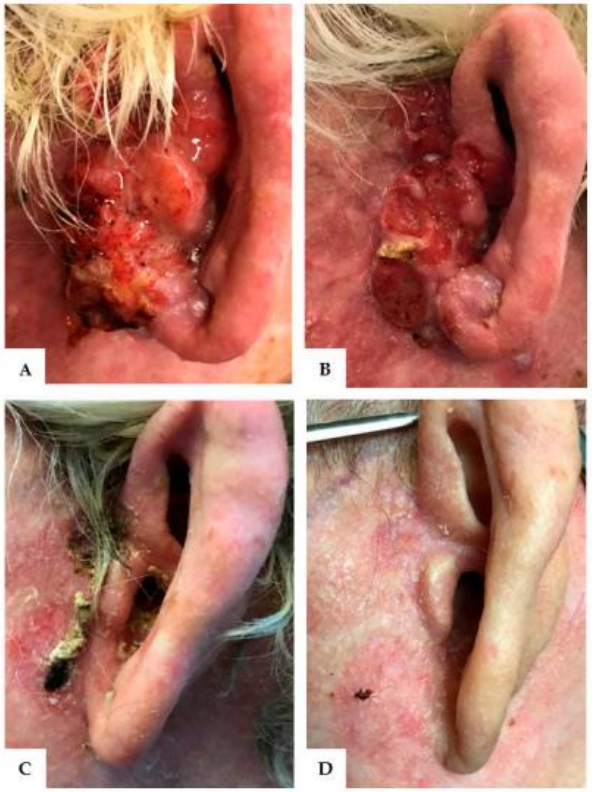

1 month

6 months

3 months

CSCC: Nivolumab and Cetuximab

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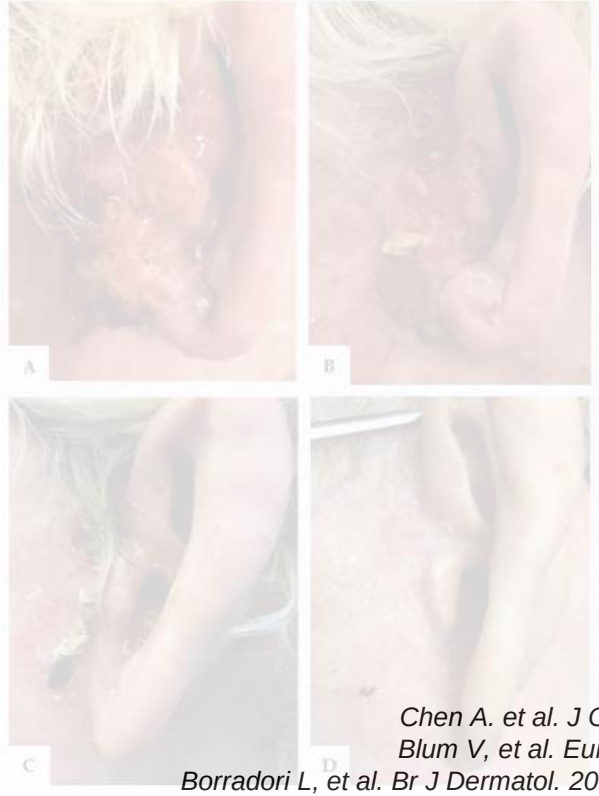

CSCC: Nivolumab and Cetuximab

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Future Target Therapy

UNIVERSITY of CALIFORNIA SAN DIEGO MEDICAL CENTER
MOORES CANCER CENTER

Genomic Landscape of Diverse Rare Tumors: Next-Generation Sequencing with Paired DNA and RNA analysis

Abstract No: 12114

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NantOmics

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METHODS

- 380 patients with diverse rare tumors who underwent next-generation sequencing were evaluated (whole genome sequencing [N=274], whole exome sequencing [106]). Among them, 250 patients had paired DNA and RNA analysis.
- De-identified dataset with rare tumor diagnosis were collected from NantHealth database.
- Somatic-specific variants were identified using paired tumor/normal comprehensive NGS. Analysis was focused on the 200 most frequently mutated genes in this cohort. Deep whole transcriptomic sequencing (RNA-Seq) (~200x106 reads per tumor) was used to determine expression of observed somatic variants.

RESULTS

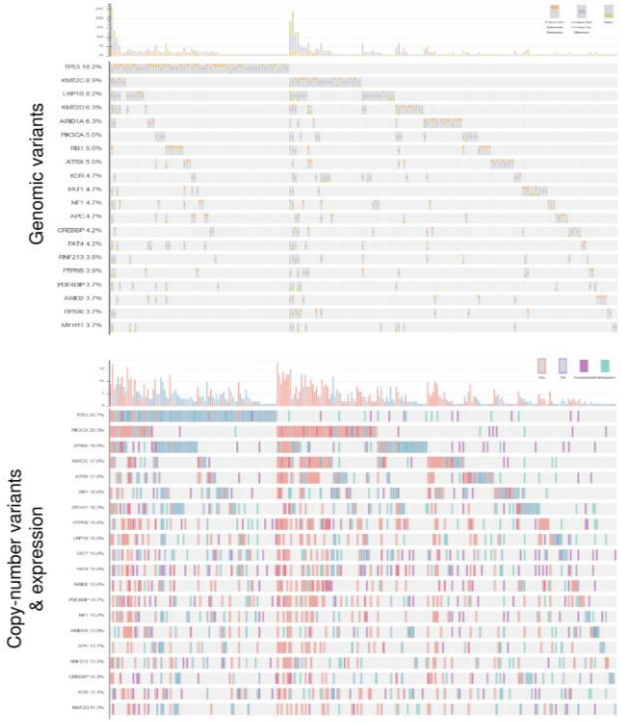
Patient characteristics (N=380)

Cancer Type	Number of patients	Frequency
Bone and Soft Tissue Sarcoma	148	38.9%
Oral and Throat Cancers (Including Thyroid)	33	8.7%
Gall Bladder Cancer	32	8.4%
Cancer of Unknown Primary	28	7.4%
Thymic carcinoma	15	3.9%
Cervical cancer	15	3.9%
Adrenal carcinoma	9	2.4%
Skin cancer (Non-Melanoma)	9	2.4%
Mesothelioma	8	2.1%

Included in the table with N>5.
Testicular (N=4), Anal (N=4), Ampulla of Vater (N=3), Penile (N=1), Vaginal (N=2), Vulvar (N=2), Small Intestine (N=2), Urethral (N=1), Renal Pelvis and Ureter Cancers (N=1)

RESULTS

Overview of genomic alterations among diverse rare tumors (N=380)



CONCLUSIONS

- Comprehensive genomic analysis is feasible among patients with rare tumors.
- Alterations were commonly seen in *TP53*, *KMT2C* and *PIK3CA*.
- Most patients had unique patterns of genomic alterations.
- Not all the genomic alterations observed in the level of DNA were transcribed.
- Further studies investigating the efficacy of an individualized precision therapy approach in patients with rare neoplasms using paired DNA/RNA analysis is warranted.

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CONCLUSION

Immunological anatomy of the skin and its **implications**

T-cell **&** Macrophage checkpoint inhibitor in cancer

Cell Therapy

Personalized target therapy

Thank you for your attention!

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