T Cell Signature Predictive of Clinical Outcome with Immunomodulatory Treatment

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CONTACT

Gemma E. Rooney
Gemma.Rooney@ucsf.edu
tel: 415-625-9093.

INVENTORS

- Fong, Lawrence
- Kwek MacPhee, Serena
- Lewis, Jera

OTHER INFORMATION

KEYWORDS

Immunetherapy, Melanoma, Andenocarcinoma, Ipilimumab, anti-CTLA-4 antibody

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Disease: Cancer

RELATED CASES

2014-197-0, 2017-163-0

INVENTION NOVELTY

Biomarkers to predict responsiveness to anti-CTLA-4 antibodies

VALUE PROPOSITION

The anti-CTLA-4 antibody, Ipilimumab, also known as YERVOY, was FDA approved for the treatment of metastatic melanoma in 2011. Ipilimumab works by inhibiting CTLA-4, a protein on T-cells that prevents them from attacking cancer cells. Only about 10-20% of melanoma patients respond to Ipilimumab. Since Ipilimumab works by stimulating the immune system, it can cause severe, potentially fatal, side effects, such as stomach pain, bloating, constipation or diarrhea, but also fever, breathing or urinating problems. Thus, it is critical to develop a diagnostic to predict which patients will respond treatment. No such method exists to date.

In addition to melanoma, clinical trials for the treatment of non-small cell lung carcinoma (NSCLC), small cell lung cancer (SCLC), bladder cancer and metastatic hormone-refractory prostate cancer with Ipilimumab are underway. Therefore, these biomarkers to predict the responsiveness of tumors to anti-CTLA-4 antibodies could benefit many cancer patients.

TECHNOLOGY DESCRIPTION

Using mass cytometry, UCSF investigators identified a population of T cells that can be quantitated in the blood of melanoma patient prior to treatment with anti-CTLA-4 antibody that is correlated with improved overall survival. The distinct set of biomarkers expressed in these T cells can be used to determine which patients to treat.

Furthermore, the investigators found that the T cells in the peripheral blood of melanoma patients who went on to respond to Ipilimumab express low levels of another set of biomarkers, which can predict the outcome in patients who have already begun treatment.

All of the biomarkers described above can be detected with conventional methodologies in clinical diagnostics, such as flow cytometry and are further described in the publications referenced below.

LOOKING FOR PARTNERS

To develop & commercialize this diagnostic

STAGE OF DEVELOPMENT

Clinical Trial

RELATED MATERIALS

- Spitzer, M. H., Carmi, Y., Reticker-Flynn, N. E., Kwek, S. S., Madhireddy, D., Martins, M. M., ... & Fong, L. (2017). Systemic immunity is required for effective cancer immunotherapy. Cell, 168(3), 487-502.
- Kwek, S. S., Kahn, J., Greaney, S. K., Lewis, J., Cha, E., Zhang, L., ... & Spitler, L. E. (2016). GM-CSF and ipilimumab therapy in metastatic melanoma: Clinical outcomes and immunologic responses. Oncoimmunology, 5(4), e1101204.

DATA AVAILABILITY

Clinical trial data described in publications

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,639,495	05/02/2023	2017-163
China	Issued Patent	CN 110546495 B	11/01/2022	2017-163
United States Of America	Issued Patent	11,215,616	01/04/2022	2014-197
Germany	Issued Patent	3281010	12/30/2020	2014-197
France	Issued Patent	3281010	12/30/2020	2014-197
United Kingdom	Issued Patent	3281010	12/30/2020	2014-197
United States Of America	Published Application	20220187299	06/16/2022	2014-197

Additional Patents Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Prospective Isolation Of Tumor-Reactive Cytotoxic CD4+ T Cells For Bladder Cancer Therapy
- NOVEL ANTIGEN TARGETS IN AUTOIMMUNE DISEASES (LUPUS AND TYPE I DIABETES) USEFUL FOR VACCINE DEVELOPMENT AND TREATMENT

ADDRESS

UCSF

Innovation Ventures

600 16th St, Genentech Hall, S-272,

San Francisco,CA 94158

CONTACT

Tel:

innovation@ucsf.edu

https://innovation.ucsf.edu

Fax: