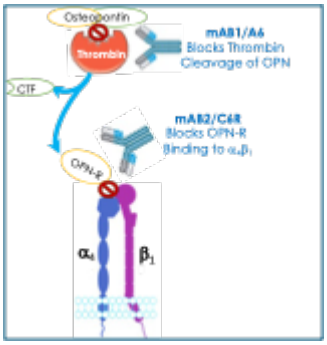
Docket #: S19-253

Targeting Osteopontin: Novel Strategy to Treat Cancer and Inflammation

Researchers at Stanford have developed humanized therapeutic antibodies to treat cancers, particularly melanoma, inflammatory disorders such as sarcoidosis and skin and organ fibrosis. These patented monoclonal antibodies target osteopontin (OPN), a protein that when cleaved by thrombin enables immune-modulation by activation of Spp1+ macrophages. Blockade of OPN cleavage or blocking of cleaved OPN fragments provides a novel approach to regulating cancer progression and survival, reducing granulomas in sarcoidosis and skin fibrosis in wound healing.



Previous studies have implicated OPN in promoting invasive and metastatic progression of many cancers. Leung Lab experimental mouse models indicate that thrombin cleavage of OPN plays a critical role in the growth and progression of B16 melanoma in vivo, granuloma formation in sarcoidosis and skin fibrosis and hair growth. These humanized therapeutic antibodies that either blocks thrombin cleavage of osteopontin cleavage (A6) or blocks activity of the resulting cleaved fragments (C6R) could potentially treat disorders like melanoma, glioblastoma, ovarian cancer in patient's refractory to check point inhibitors and inflammatory disorders, skin and organ fibrosis by modulating Spp1+ macrophages.

Figure 1

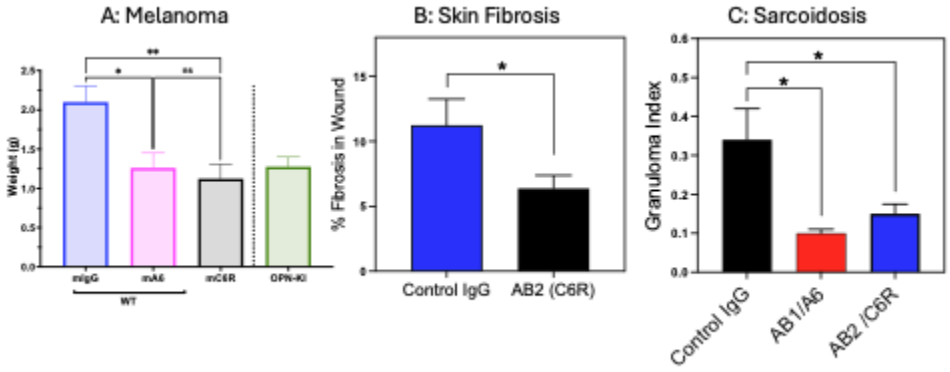


Figure 1 Description: Anti-OPN antibodies suppress Melanoma tumor growth and metastasis (A), Reduces scar formation after skin injury (B) and Suppresses granuloma formation in vivo using murine models (C). (Image Credit: the Inventors)

Stage of Development: Research In Vivo

Leung Lab mouse studies demonstrate that the monoclonal antibodies have the benefit of modulating Spp1+ macrophages over a range of indications, in particular the treatment of cancers refractory to current standard of care, granuloma formation in Sarcoidosis. Skin fibrosis and scarring is an attractive indication since there is no effective treatments for keloids, traumatic wounds and cosmetic surgeries.

Applications

- Treatment of melanoma and other cancers particularly those refractory to current standard of care (Check point inhibitors), either as a monotherapy or in combination
- Treatment of inflammatory disorders, such as granuloma formation, cardiac hypertrophy, and myocardial fibrosis
- Skin and organ fibrosis

Advantages

- Antibodies can be used for a broad range of indications
- Used as an alternative arm to current standard of care for cancer treatment
- Potential for first to market for treatment of skin fibrosis, scarring and wound healing

Patents

- Published Application: WO2021030209
- Published Application: 20220324956
- Published Application: 20250361293
- Issued: 12,351,625 (USA)

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