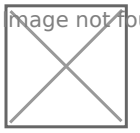
Docket #: S11-262

Epidermal growth factor (EGF) mutants for wound healing and tissue engineering

A team of Stanford engineers has identified first-in-class epidermal growth factor (EGF) mutants with enhanced activity. These mutants can stimulate increased EGF receptor activation at 10-fold lower concentrations than wild-type EGF. They were identified using a novel screening platform with a biological read-out. Their improved mitogenic activity could overcome the current challenge of delivering and maintaining sufficient concentrations of EGF at target sites for applications such as cellular/tissue development or treatment of short-term and chronic wounds. The US patent for this technology issued on October 21st, 2014. (US 8,865,864, "Mutant Epidermal Growth Factor Polypeptides with Improved Biological Activity and Methods of Their Making and Use.")



EGF mutant (point mutations shown in red) mapped onto the crystal structure of EGF (blue) bound to EGFR (grey). This mutant enhances cell proliferation compared to native EGF.

Stage of Research

The inventors have engineered the EGF mutants, characterized their biological activity and demonstrated their effects on human fibroblast cells.

Applications

- **Wound healing** - therapeutic agents to accelerate the repair of short-term or chronic wounds
- **Tissue engineering** - human tissue culture reagent to direct and accelerate growth and development of cells

Advantages

- **Enhanced activity** - first-in-class EGF super-agonists
- **Reduced costs** - compared to wild type EGF, less EGF mutant protein would be needed to achieve the same level of mitogenic activity
- **Improved efficacy** - EGF mutants may be more effective than wild type EGF because delivery and maintenance of sufficient concentrations of EGF at target sites is currently a limiting step to therapeutic uses of EGF

Publications

- Lahti JL, Lui BH, Beck SE, Lee SS, Ly DP, Longaker MT, Yang GP, Cochran JR. Engineered epidermal growth factor mutants with faster binding on-rates correlate with enhanced receptor activation. *FEBS Lett.* 2011 Apr 20;585(8):1135-9. Epub 2011 Mar 23.
- Lui BH, Cochran JR, Swartz JR. Discovery of improved EGF agonists using a novel in vitro screening platform. *J Mol Biol.* 2011 Oct 21;413(2):406-15. Epub 2011 Aug 23.

Patents

- Published Application: 20130053314
- Issued: 8,865,864 (USA)

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