Engineered Human Umbilical Vein Endothelial (E-CEL UVEC®) Cells As Pro-healing, Regenerative Biological Adjunct For Minimally-Invasive, Endoscopic Colorectal Surgeries

Rohit Rasane MBBS MS[1], Jeffrey Milsom MD FACS[1], Paul Finnegan MDCM FRCPC[2]

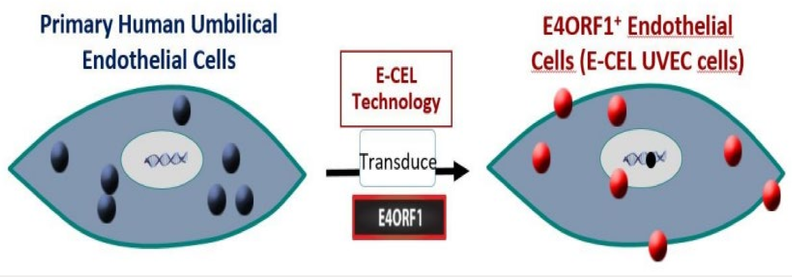
1-Department of Surgery, Weill Cornell Medicine, New York, NY; 2- Angiocrine Bioscience Inc. San Diego, CA.

Objectives

- To develop novel technologies to accelerate the healing of diseased gastrointestinal or soft tissues using minimally invasive techniques.
- Emphasizing the importance of treating tissues in areas where complex surgeries are hazardous, by utilizing precise and effective methods to promote healing via advanced cell therapy.

Description of the technology

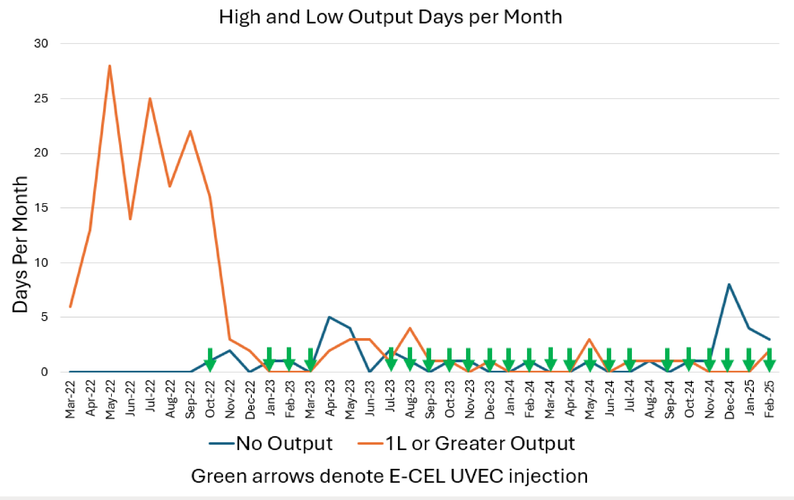
- E-CEL UVEC® cells (E4+ HUVECs) are allogeneic **h**uman **u**mbilical **v**ein **e**ndothelial **c**ells transduced with a pro-survival gene, E4ORF1 (a nontoxic housekeeping gene originally derived from adenovirus).
- E4ORF1 transduction of HUVECs enables **phenotypic stability** and enhanced reparative/ regenerative potency compared to primary HUVECs, enabling biopharmaceutical development.



- Mechanism of action is paracrine and juxtracrine via expression of angiocrines which act as a nidus for re-establishment of normal repair by **rescuing dysfunctional endogenous microvasculature** and promoting reparative immune response.

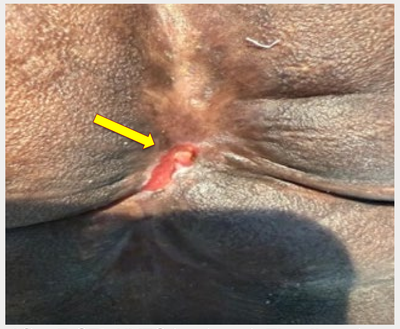
Clinical story & results

- The patient with a history of Hirschsprung disease has a long-standing **non-healing entero-cutaneous fistula.**
- This patient has had multiple surgeries resulting in extensive internal scarring with prohibitive risks with conventional surgical treatments. Currently on TPN with minimal oral intake.
- The internal opening was visualized with a colonoscope, then injected with E-CEL UVEC cells around the opening.
- After 23 monthly injections, significant **reduction in the size** of the aperture of the **internal opening** was noticed (photos).
- No adverse reactions were noted.
- Additionally, we injected the E-CELs percutaneously along the tract, resulting in a progressive **reduction of the external opening diameter**, as well as a dramatic **reduction of fistula output**.

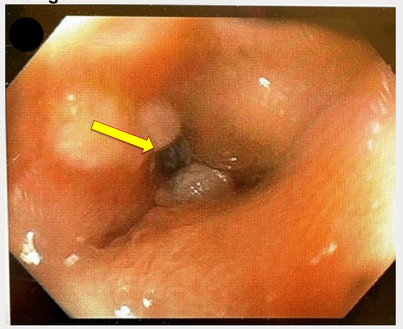




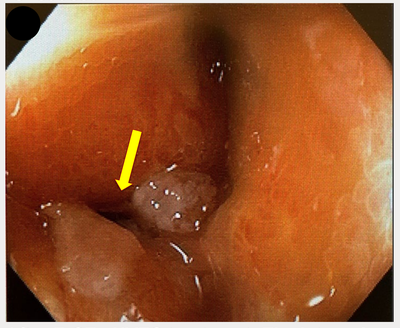
Before E-CEL UVEC treatment: The diameter of the external opening of the fistula (arrow) is large.



After E-CEL UVEC treatment: The diameter of the external opening of the fistula (arrow) is reduced.



Before E-CEL UVEC treatment: The internal opening of the fistula (arrow).



After E-CEL UVEC treatment: The internal opening of the fistula (arrow) nearly closed.

Conclusions/Future directions

- The use of E-CEL UVEC® cells as a regenerative biological agent appears to be safe and may decrease output from refractory enterocutaneous fistulas.
- Further evaluation of E-CEL UVEC cells in surgical wound healing is needed.

Contact information: rkr4004@med.cornell.edu