

## EXECUTIVE SUMMARY

Allander Biotechnologies, LLC is a preclinical company developing a regenerative treatment for oral ulcers caused by cancer therapy. No treatment for cancer therapy-induced oral ulcers exists today. About 40-70% of cancer patients suffer with oral ulcers causing extreme pain and leading to \$13B additional healthcare costs and four-fold increased mortality risk.

Technology: Allander's technology is based on seminal research by the Founder, Dr. Xiao-Jing Wang, showing that transgenic mice over-expressing Smad7 are not susceptible to radiation-induced oral ulcers. From this discovery, Dr. Wang designed a fusion protein containing the human Smad7 protein fused to a cell penetrating peptide (CPP) from the HIV-1 Tat protein transduction domain (CPP-Smad7). The CPP allows the Smad7 fusion protein to enter cells rapidly (within a minute), thereby avoiding degradation in the extracellular milieu, and allowing a 36 hour half-life.

Competitive Advantage: Allander's solution is a topical formulation of CPP-Smad7 that enters cells on contact. In this context, CPP-Smad7 acts as an intracellular protein that inhibits TGF-beta and NFkB, the two pathways essential for oral ulcer pathogenesis and cancer metastasis. CPP-Smad7 applied directly to mouse, hamster, and canine (in progress) oral mucosa shows preventive and therapeutic healing of oral ulcers. In addition, treatment of mouse oral ulcers with the Smad7 fusion protein enhances radiation treatment of adjacent oral cancer by increasing cell death. As a result, unlike Palifermin (Sobi's Kepivance), which is not approved for use in cancer patients, the Smad7 fusion protein market should include 40-70% of the 650,000 total cancer patients in the US each year. In addition, unlike Palifermin, Smad7 fusion protein both prevents and treats oral ulcers, showing dramatically enhanced healing compared to Palifermin in comparison studies.

Competitive Landscape: There are other companies developing competing products, with Soligenix' Dusquetide the most advanced therapeutic in Phase III clinical trial. Allander's CPP-Smad7 acts through increasing epithelial growth and migration, reducing inflammation, increasing DNA damage repair, and providing some tumor suppression activity. None of the competitors provide all of these activities, and all are important in preventing and healing oral ulcers. In addition, CPP-Smad7 is provided as a topical formulation requiring once daily administration, unlike Dusquetide which requires IV infusion.

Pipeline: Allander has an exclusive license to a robust patent portfolio covering CPP-Smad7, derivatives, and their use in multiple indications including oral ulcers, a global market valued at \$2.2B. Allander's pipeline includes cancer therapy induced radiodermatitis, as well as diabetic ulcers and psoriasis, all of which have shown efficacy in at least one animal model. Allander's platform technology also allows future development of other CPP-Smad7 derivatives for specific indications.

Past Traction: Allander has received seed funding of \$1M from Angel investors. Funding from grants including three SBIR Phase 2 Awards (\$6M) has supported the continued development of the Smad7 fusion protein for oral ulcers, radiodermatitis, and diabetic ulcers. In preparation for pre-IND filing and GLP pharmacokinetic and safety studies, Allander has refined CPP-Smad7 production for scale up and finalized CMC release assays. Allander is working with regulatory consultants to design the non-clinical GLP studies and the initial Phase I/II clinical trial for the use of Smad7 fusion protein for the treatment of cancer therapy-induced oral ulcers.

Team: Xiao-Jing Wang, MD, PhD, Founder, President & CSO, leads Allander, supported by Christian Young, PhD, Chief Scientist, Heather Callahan, PhD, JD, eMBA, Director Intellectual Property, and Bing Zhao, MS, PhD, Lead Investor and business and financial advisor. Allander has assembled a team of advisors including David Raben, MD from Genentech, Sibylle Hauser, PhD and Maileen Flores from RICHTR, Rick Harkins, formerly at Bayer Healthcare, Barry Holwerda, CEO of MtiBio, Christina Vessely, PhD of Biologics Consulting Group and Melanie Hartsough, PhD of Hartsough Consulting.

Funding Request: Allander will be eligible for Phase 2B SBIR funding of \$4M through the National Cancer Institute to support a clinical trial of the use of CPP-Smad7 for the treatment of cancer therapy induced oral ulcers. To obtain this funding, Allander must raise \$4M in matching funds from other sources. The \$8M is expected to provide funding to complete the Phase I/II clinical trial positioning Allander for acquisition, partnering, or an additional raise to fund a Phase II/III clinical trial.