**INTRODUCTION:** DWP-450 is a 900 kDa botulinum toxin type A produced by *Clostridium botulinum*.

**OBJECTIVE:** To demonstrate the safety and efficacy of DWP-450 for the treatment of moderate-to-severe glabellar lines associated with corrugator and/or procerus muscle activity in adult subjects.

**DESIGN:** Two identical double-blind placebo-controlled 150-day single-dose Phase III studies (EV-001 and EV-002) conducted at a total of 20 U.S. centers.

**METHODS:** Study subjects were at least 18 years of age and had moderate (GLS=2) to severe (GLS=3) glabellar lines at maximum frown, on the 4-point photonumeric Glabellar Line Scale (GLS, 0=no lines, 1=mild, 2=moderate, 3=severe). Subjects were randomly assigned in a 3:1 ratio to receive a single treatment (0.1 mL injected into each of 5 target sites in the glabellar region) of either DWP-450 (total of 20 U, administered as 4 U/0.1 mL) or Placebo (0.9% saline). Subjects were then followed for 150 days. The primary efficacy endpoint was defined as the proportion of subjects classified as responders on Day 30. This was a composite endpoint based on both the Investigator and subject’s assessments of glabellar lines at maximum frown on the GLS; a subject was a responder only if both independently agreed that a $\geq 2$ point improvement had occurred from Day 0 to Day 30. Safety was evaluated throughout the study.

**RESULTS:** 330 subjects participated in the EV-001 study; 324 participated in EV-002.

For the primary efficacy endpoint, in EV-001 and EV-002 the percentages of responders in each of the Placebo and DWP-450 groups were 1.2% and 67.5%, and 1.3% and 70.4% respectively; the absolute difference between groups was 66.3% (p<0.001) and 69.1% (p<0.001) respectively.

Also at Day 30, as assessed by the Investigator using the Global Aesthetic Improvement Scale, in EV-001 and EV-002 the proportion of responders was 95.8% and 92.9% respectively.

CONCLUSION: The results of these two parallel US phase III studies successfully met the pre-defined primary endpoint.

**Alopecia in Male Patients Treated with ATX-101 (Deoxycholic Acid) for Submental Fullness**

**Presenter:** Sachin M. Shridharani, MD  
**Co-Author:** Akash A. Chandawarkar, MD

**INTRODUCTION:** Deoxycholic acid is approved for minimally invasive treatment of submental fat. Safety profiles from pivotal studies did not report on the potential adverse effect of localized alopecia. Knowledge about any potential adverse event, including alopecia, is important for informed consent and setting patient expectations. This study is the first to characterize alopecia in patients undergoing deoxycholic acid treatment for submental fat.

**METHODS:** A retrospective review was conducted of 171 patients (66 male) treated with deoxycholic acid in the submental region at a single-center between January 2015-December 2016. Deoxycholic acid was injected into the preplatysmal submental fat (0.2 mL per injection of 10mg/mL to achieve a dose of 2mg/cm$^2$) for a maximum of 6 treatments. Patient characteristics, treatment plan, and severity/resolution of alopecia was analyzed.

**RESULTS:** Alopecia was reported in 15% of male patients (none observed in female patients). Severity of alopecia in follow-up patients (n=8) ranged from diffuse/mild to 6 patches of alopecia, and was not associated with dose delivered or number of injections. Alopecia was noticed a median 31.5 days after injection (range 15–94 days). Five of eight patients reported improvement or complete resolution of alopecia. Six of eight patients experienced alopecia after the first treatment. Five of eight patients sought further treatment despite alopecia.

**CONCLUSION:** Alopecia is a real adverse event following treatment of deoxycholic acid for submental fat reduction in males that occurs approximately 1 month after treatment. Severity is not dependent on treatment plan, and is likely due to
patient characteristics. While a majority of patients had improvement or resolution, longer follow-up is needed to further assess the transiency of injection-induced alopecia. Importantly, a majority of patients continued to seek further treatment, suggesting patient-impact of this alopecia was low compared to the benefits of submental fat reduction.

Reference Citations:
1. Kythera Biopharmaceuticals I. Dermatologic and ophthalmic drugs advisory committee briefing document: ATX-101 (deoxycholic acid) injection. https://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/Drugs/DermatologicandOphthalmicDrugsAdvisoryCommittee/UCM436604.pdf. Accessed February 26, 2017.
2. Dayan SH, Humphrey S, Jones DH, et al. Overview of ATX-101 (Deoxycholic Acid Injection): A Nonsurgical Approach for Reduction of Submental Fat. Dermatol Surg. 2016;42:S263-S270.

CRANIOMAXILLOFACIAL/HEAD & NECK SESSION 3

Scaffolding the Scaffold: 3D-Printed External Biodegradable Cage Mitigates Contraction during Maturation of Elastic Cartilage Constructs

**Presenter:** Jaime L. Bernstein, BS  
**Co-Authors:** Benjamin P. Cohen, BS; Alice Harper, BA; Omer Kaymakcalan, MD; Lawrence J. Bonassar, PhD; Jason A. Spector, MD  
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**INTRODUCTION:** Although in previous work we have successfully generated full-scale ear constructs from human auricular chondrocytes (HAuC) and Human Mesenchymal Stem Cells, the main obstacle for clinical translation of the constructs is the shrinkage and loss of topographic definition that occurs during their in vivo implantation/maturation phase. It is known that tension forces generated by skin and other surrounding tissues contribute to the contraction and loss of topography of a collagen hydrogel. We hypothesize that 3D-printing of an external cage to surround our collagen-chondrocyte hydrogel will allow us to study how shielding our auricular scaffolds from naturally occurring external forces has the potential to reduce contraction and preserve topography, while not interfering with neocartilage formation

**METHODS:** HAuCs were isolated from discarded otoplasty specimens and then encapsulated into 8mm disc type I collagen hydrogels with a cell density of 25 million cells/mL. Custom external cages were 3D-printed out of biocompatible polyactic acid (PLA) with high fidelity contour matching to the hydrogel. The hydrogels surrounded by the PLA cages were implanted into the dorsum of nude mice and explanted after 1 month in vivo for analysis.

**RESULTS:** The external PLA cages were able to maintain their shape/strength after 1 month in vivo, providing the protection the hydrogels needed for undisturbed formation of neocartilage. After 1 month in vivo, the discs developed a shiny white cartilage-like appearance, similar to native auricular cartilage. The discs maintained in the external cages contracted on average only 4.17%, which is significantly less contraction than our usual human auricular cartilage constructs, which contract at least 25%. In addition, safranin-o staining shows cartilage formation, proving our design allows sufficient flow of nutrients in vivo for chondrocyte survival and function.

**CONCLUSION:** We have shown that a custom 3D-printed external cage made out of a biocompatible and biodegradable material can be used to mitigate contraction of our auricular chondrocyte scaffolds. We have validated a methodology that not only has the potential to optimize our tissue engineered auricles, but to solve a problem of cartilage contraction well documented in literature that no one has been able to conquer before. The same technique can be applied to create cages that faithfully conform to the contour of full scale auricular scaffolds in order to preserve their complex topography.

**Implantable Deferoxamine Facilitates Non-Vascularized Grafting in Irradiated Bone**

**Presenter:** Alexis Donneys, MS, MD