



STP705 isSCC Clinical Phase Update



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Presenters



Patrick Lu, PhD Founder, Chairman of the Board, **Executive Director,** President & CEO

28+ years of experience





Kevin Li, MD **VP of Medical Affairs**

26 years of experience









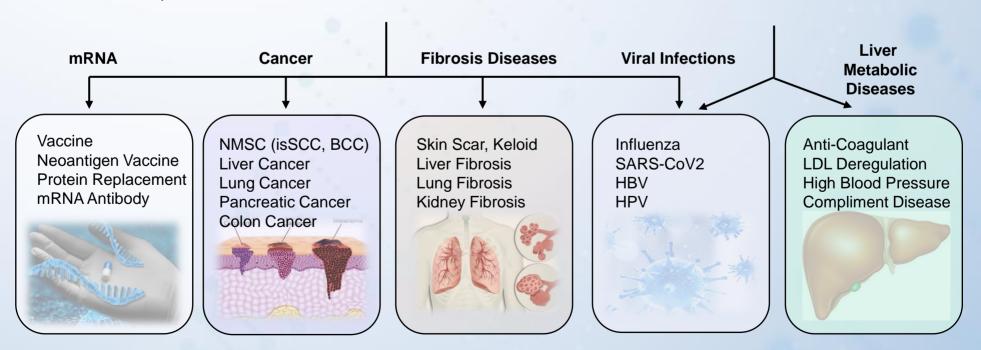




Two Proprietary Delivery Platforms and Therapeutic Areas

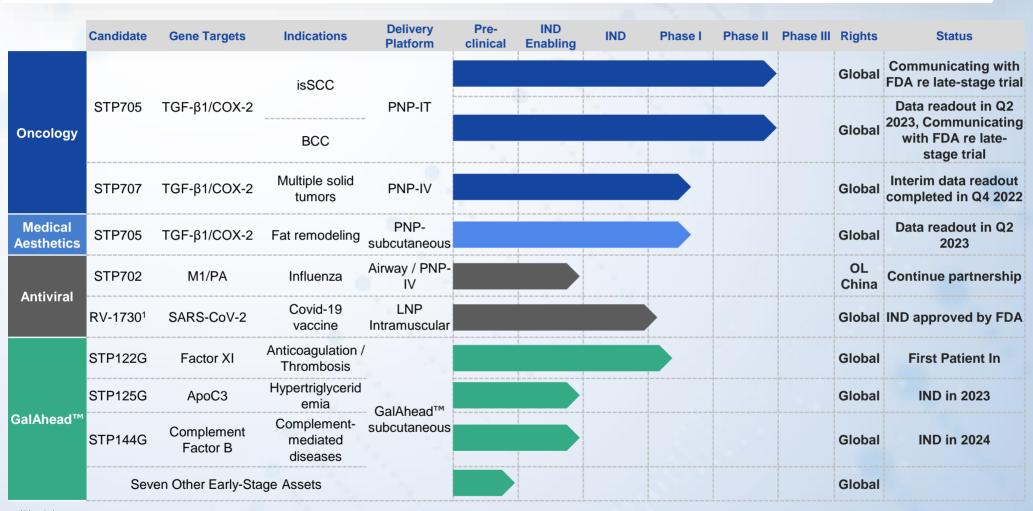


HKP and HKP(+H) are well suited for siRNA Therapeutics or mRNA Therapeutics and Vaccine Deliveries





Prioritized Product Pipeline Advancing Oncology Programs



Abbreviations.

isSCC= cutaneous squamous cell carcinoma in situ; BCC= basal cell carcinoma; PNP = our polypeptide nanoparticle (PNP) RNAi delivery platform; PNP-IT = PNP platform formulated for intratumoral administration; PNP-IV = PNP platform formulated for intradermal administration, GalAhead = our GalNac RNAi delivery platform that conjugates GalNac moieties to RNAi triggers; LNP = lipid nanoparticle (LNP) formulation for delivery of mRNA; OL China = out-licensed mainland China, Hong Kong, Macau, and Taiwan rights under agreement with Walvax but we retain the rights for rest of the world.

Priority to advance STP705 to late-stage development and validation of PNP platform with positive STP707 data. Dual platform play increases possibility of success of drug development

^{1.} Research and development conducted by our subsidiary RNAimmune.

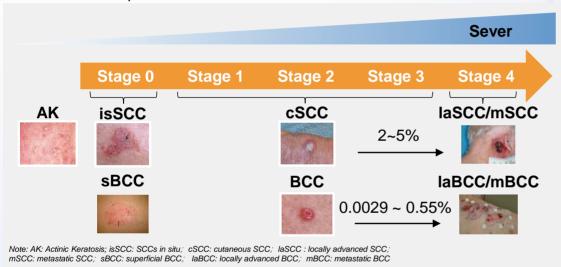


Non-Melanoma Skin Cancers (NMSC)

One of the most common cancers in the U.S. with growing market potential

Overview

- BCC and SCC account for the majority of NMSCs with more than five million newly diagnosed cases estimated to occur in the U.S. every year
- Squamous cell carcinoma in situ (isSCC), also known as Bowen disease, is the earliest form of squamous cell carcinoma



Market Drivers

- Exposure to UV radiation
- The incidence of precancerous skin conditions such as actinic keratoses, moles and freckles, owing to an aging population
- Genetic susceptibility to diseases
- More treatment options available
- Country-wide skin cancer screening was introduced and became more prevalent for residents older than 35 years of age with health insurance since 2008 in the U.S., leading to an increase in diagnosis rate

Annual number of deaths from SCC or BCC in the U.S.

> 18,000



BCC and SCC prevalence from 2015 to 2020

+33%

Number of cases of SCC 1

3.2m Estimate 6.8m

Number of cases of BCC¹

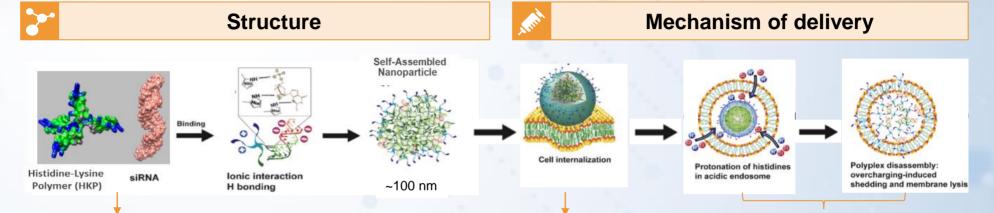
2.5m Estimate 4.4m 2020 2030

Source: Prospectus Industry Report, CIC, Boston Consultant Group Note: (1) sum of the U.S. and China.

Unmet needs: further improvements in skin appearance and convenience is the key



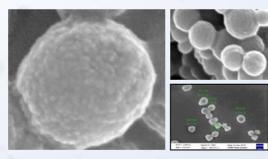
Unique Property of PNP (HKP) for siRNA Delivery



Inherently safe structure

- Biodegradable histidine-lysine branched polypeptides
- Polypeptides with no chemical modification required, Low immunogenicity in preclinical and clinical studies
- Stable in human body in absence of chemical modification
- Gene knockdown activity:
- 7+ days in the skin
- Up to 4 days in tumors
- 16 days in the tissues around the eyes and the eyeball (injection)
- Large scale manufacturing with microfluidic technology

Unique properties for PNP



- PNP has a rough surface, with cell penetration property ("CPP")
- Possible to envelop and protect 10k-100k siRNA into HKP to facilitate delivery into the targeted tissue & cell
- Controlled release property
- Can enter target activated endothelial cells through the NRP1 receptor

Efficient endosome escape

The percentage of endosome escape translates to the efficiency of delivery of siRNA. PNPsiRNA has shown high endosome escape efficiency



Prof. Jim Mixson
University of Maryland
Inventor of HKP

Sirnaomics have PNP exclusive global patent rights on PNP



Polypeptide Nanoparticle Platform for RNA Delivery

Backbone PNP delivery platform is a potential game changer

Significant advantages against existing platforms



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High delivery efficiency

for both local and systemic applications

Validated safety

tested locally in human and systemically in NHP

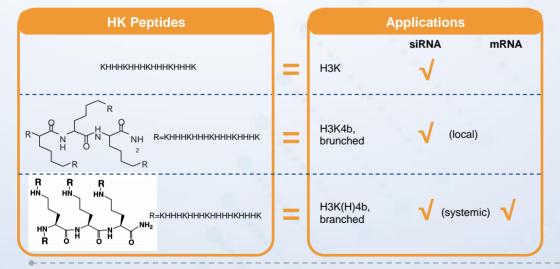
High packaging efficiency

>97% loading, can carry multiple RNA molecules

Simple and stable Formulation

easy synthesis process, no cold chain storage required

Highly efficient for broad applications using different encapsulating peptides



siRNA is much more than for hepatocytes of the liver

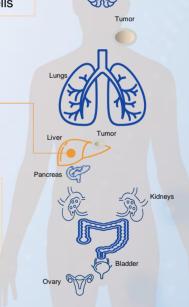
A wide range of organs targeted:

Tumor cells, lung cells, and non-hepatocyte liver cells



Multiple administration routes:

IV, IT



*The organs shown in the picture are targeted

Current Clinical Uses: isSCC (Ph IIb), BCC (Ph II), Keloid (Ph 1/2), HTS (Ph IIa), liver cancer(basket) (Ph 1), Solid tumors (Ph I)



Planned Clinical Uses: Solid tumors, liver cancer, Cholangiocarcinoma, pancreatic cancer, Colorectal Cancer, NSCLC, cSCC, lung fibrosis, liver fibrosis, etc.







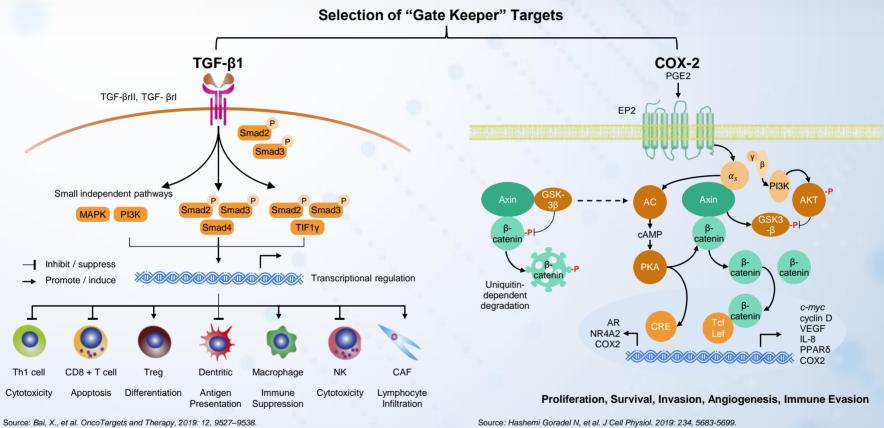


Core Product STP705 (Local Formulation)



Innovative Dual-Targeted RNAi Therapeutics

Targeting both TGF-ß1 and COX-2



ce. bai, x., et al. Offico raigets and Therapy, 2019. 12, 3027-3000.

Mechanism of Action: The mechanism of action for both TGF-β1 and COX-2 in tumor biology and fibrotic disease is widely recognized

Drugability: A dual-targeted RNAi drug design inhibits both TGF-β1 and COX-2 simultaneously for high therapeutic potency

Minimize Toxicity: PNP delivery platform enables to create cell- and tissue-selective targeting of the TGF ß1/COX 2 inhibitory activity provided by the siRNA therapeutic and avoiding whole body exposure

Drug Formulations: Local formulation STP705 uses HKP, and systemic formulation STP707 uses HKP+H

Key Publication: Simultaneous silencing of TGF-β1 and COX-2 reduces human skin hypertrophic scar through activation of fibroblast apoptosis, *Lu*, *Li* et al. Oncotarget, 2017 (9)

IP Protection for this Key Asset: Strong intellectual property position



Preclinical - Confirm Effective Dosage & Interval

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Oncotarget, 2017, Vol. 8, (No. 46), pp: 80651-80665

Research Pane

Simultaneous silencing of TGF-β1 and COX-2 reduces human skin hypertrophic scar through activation of fibroblast apoptosis

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Keywords: siRNA therapeutics, hypertrophic scar, TGF-β1, COX-2, synergistic effect

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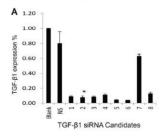
HKP and siRNA are mixed in aqueous solution with an optimized N/P ratio (4/1; weight/weight), self-assembly

of nanoparticles occurs through electrostatic and non-

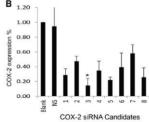
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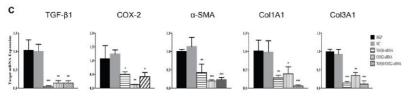
HKP enhances siRNA delivery into human hypertrophic scar

To ensure efficient siRNA delivery to the hypertrophic sear, we selected a biodegradable histidinelysine polypeptides (HKP) that has been demonstrated to provide efficient siRNA delivery *in vivo* [17, 18]. When



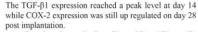
ionic bonds. These nanoparticles can be lyophilized into dry powder and then re-formulated with aqueous solution (Figure 3A, Supplementary Figure 4). The lyophilized HKP (TGF-β1/COX-2siRNA) nanoplex powder once re-



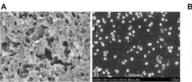


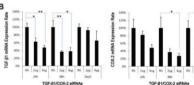
HKP-packaged TGF-β1/COX-2 siRNA (STP705) reduces size of human hypertrophic scar

As expected, we found that TGF- β 1 and COX-2 were significantly over-expressed in human hypertrophic scar (HS) tissue from patients compared to normal skin tissue (Figure 4A). Human HS tissues were implanted onto nude mice subcutaneously for studying the pathophysiology of HS and the efficacy of siRNA silencing. After HS tissue was implanted, we analyzed these tissues at day 7, day 14 and day 28 post implantation. We then isolated mRNA from the tissue samples to determine the expression dynamics of TGF- β 1, COX-2 and α -SMA using qRT-PCR analyses (Figure 4B). The expression of TGF- β 1 and COX-2 in the implanted human scar tissues exhibited an unexpected pattern with a rapid increase of TGF- β 1 versus a steady increase in COX-2.



Based on the results from Figure 3D and Figure 4B, we initiated treatment on the implanted human hypertrophic scars on mice four weeks after surgery. A 20 $\mu g/50~\mu l$ /cm3 HKP (TGF- $\beta l/COX-2siRNAs)$ was administered to each scar implant using 5 aliquots into 5 different sites of the scar, with three repeated injections at 5 days intervals. The STP705 combination treated HS implants showed a significant reduction in size of implanted tissues at day 28 post-treatment (Figure 4C–4D), by about 45% compared to the untreated group. After tissue samples from those implants were further analyzed, we found that not only the targeted genes TGF- βl and COX-2 were significantly silenced based on the qRT-PCR results, but other proteins such as α -SMA and col1A1 were also





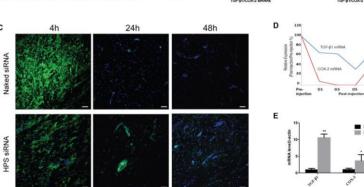


Figure 3: HKP Enhances Intra-scar Delivery of siRNA (A) SEM image of HKP (TGF-β1/COX-2siRNAs) nanoparticles. After resuspension of lyophilized HKP (siRNA) nanoparticles in aqueous solution, these particles had an average size of 150 mm in size and similar size distribution, properties of which are typical for intra-scar siRNA administration. (B) Real-Time qPCR analysis of the tissue samples revealed HKP packaged TGF-β1/COX-2siRNAs knocking down TGF-β1 and COX-2 in a dose-dependent manner. Whereas TGF-β1 was down regulated more between 24–48 hours post treatment, COX-2 decreased more between 48 and 96 hours post treatment (n = 6). NS is Lu25-a 5'-(TGAGGAGGCUCCUC-G)-3', at 2µg serving as control siRNA. (C) The siRNA-Alexa Fluor labeled and HKP-packaged siRNA-Alexa Fluor labeled were compared in vivo for their duration and dispersion after local intra-scar injection, using human hypertrophic sear tissue implant model with mice, at three time points: 0 hour, 24 hour and 48 hour post administration. HKP formulated siRNA resulted in a prolonged siRNA duration after intrascar injection into human hypertrophic scar implant. (D) Injections of HKP (TGF-β1/COX-2siRNAS) nanoparticle solution into the human hypertrophic scar resulted in down regulations of TGF-β1 and COX-2 expressions in human normal skin tissue (NS) and human hypertrophic scar tissue (HS) (n = 3, *P < 0.05).

www.impactjournals.com/oncotarget 80656 Oncotarget

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STP705 - Provides Positive Clinical IIa Results for isSCC

Ph Ila Study design and results



- A total of up to 25 subjects with diagonized isSCC, 5 cohorts
- Intratumor injection with 5 different dosage groups
- Giving the right dosage to each subject for once a week for up to 6 weeks. Histology Analysis at week 7 for completed clearance (primary endpoint)

Professor Brian Berman, MD/PhD, Univ. Miami

<u>10µg</u>	<u>20μg</u>	<u>30µg</u>	60µg	<u>120μg</u>	
40%	60%	80%	100%	80%	
(2/5)	(3/5)	(4/5)	(5/5)	(4/5)	

Result 1: 19/25 reach to the primary endpoint (76%)

Result 2: 30µg and 60µg groups demonstrated the best

results (9/10) with 90% efficacy

Result 3: No SAEs, no TEAEs related to the study

Result 4: Improved cosmetic appearance

Selection of effective and safe dosage 30 μg and 60 μg for Clinical Phase IIb study

Comparison between current treatment options and STP705 treatment

- Surgery, curettage and electrodesiccation are the cornerstone treatments of NMSC. However, they have higher risk of infection, bleeding and will leave scars on skin
- Non-surgical treatments(e.g. topical) can be considered for low-risk
 NMSC, but generally they are less effective
- Appearance remains one of the key needs in NMSC treatment and has a significant impact on patient preference, especially for patients with lesions in the head or neck

Pre-Treatment





End of treatment





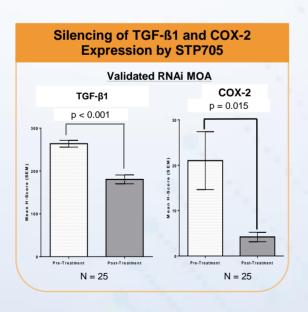


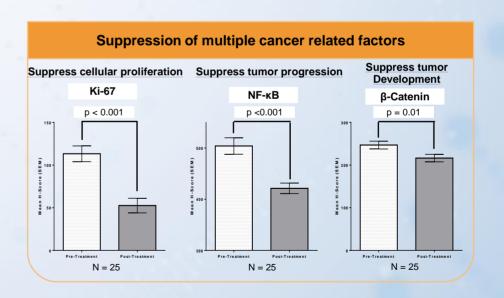
STP705 - Data Sets Support Anti-Tumor MOA for isSCC

Target-Validation

Knockdown of TGF-β1 and COX-2 was validated by RT-PCR following tissue sample collection

Knockdown tumor growth associated targets was validated by RT-PCR following tissue sample collection





Knockdown of TGF-β1 and COX-2 resulted in increased T-cell infiltration to tumors, enhancing killing of tumor cells by the immune system

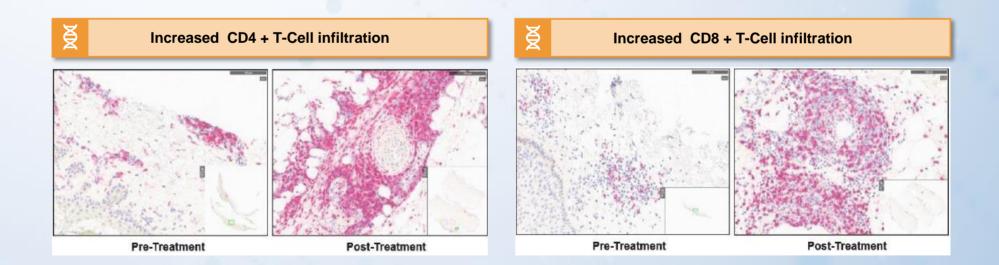


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Effectiveness of Treatment Published in Clinical Journal

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ORIGINAL ARTICLE

JOURNAL OF DRUGS IN DERMATOLOGY

Safety and Efficacy of TGF- β 1/COX-2 Silencing Therapeutic in Adults With Cutaneous Squamous Cell Carcinoma In Situ

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ABSTRACT

This single-center, open label, dose escalation cohort study evaluated the safety and efficacy of various doses of intralesional injections of TGF β 1/COX-2 combined with histidine-lysine polypeptide (siRNA/HKP) nanoparticle silencing therapeutic in patients with cutaneous in situ squamous cell carcinoma. Twenty-five patients (mean age: 67, SD: 10 years; 52% men) with cutaneous in situ squamous cell carcinoma participated. TGF β 1/COX-2 siRNA/HKP nanoparticle therapeutic was injected weekly for up to 6 weeks based on the following dosing cohorts: 10 μ g/treatment, 20 μ g/treatment, 30 μ g/treatment, 60 μ g/treatment, and 120 μ g/treatment. The primary endpoint was the proportion of subjects with complete histological clearance. Also evaluated were the incidence/severity of treatment emergent adverse events and serious adverse events and incidence/severity of Local Skin Response. Twenty-five subjects received the TGF β 1/COX-2 siRNA/HKP nanoparticle therapeutic; 19 (76%) achieved histological clearance. In the 30 μ g/treatment group and 60 μ g/treatment group, percent cleared was 80% and 100%, respectively. Five subjects had 7 adverse events. There were no severe or serious adverse events; none led to treatment discontinuation, study interruption, or were related to the investigational product. Local skin response was none to minimal in most subjects, with improvement observed in the 10 μ g/treatment, 20 μ g/treatment, 30 μ g/treatment, and 60 μ g/treatment cohorts. Intralesional TGF β 1/COX-2 siRNA/HKP nanoparticle therapeutic injections appear to be noninvasive, safe, and efficacious in treating cutaneous in situ squamous cell carcinoma. The recommended doses for future study of the investigational product are 30 μ g/treatment and 60 μ g/treatment.

J Drugs Dermatol. 2022;21(5):472-477. doi:10.36849/JDD.6384

FIGURE 1A. The pre-treatment, squamous cell carcinoma in-situ lesion on the left radial dorsal hand of a 45-year old, white female patient is pictured. The biopsy at the time of screening confirmed the presence of squamous cell carcinoma in-situ before treatment with 60µg/treatment of TGF-β1/COX-2 siRNA/histidine-lysine polypeptide therapeutic. The local skin response score was 3, with visible erythema surrounding the lesion.



FIGURE 1B. T post-treatment lesion site of the same patient after 6 weeks of treatment with 60 μ g/treatment of TGF-β1/COX-2 siRNA/ histidine-lysine polypeptide nanoparticle therapeutic is pictured. Complete histological (margins free of tumor) and clinical clearance of squamous cell carcinoma in-situ is observed, and the final local skin response score was 2.



female patient in the 60 μ g/treatment group that was cleared of isSCC after 6 weeks of treatment with TGF- β 1/COX-2 siRNA/HKP nanoparticle therapeutic.

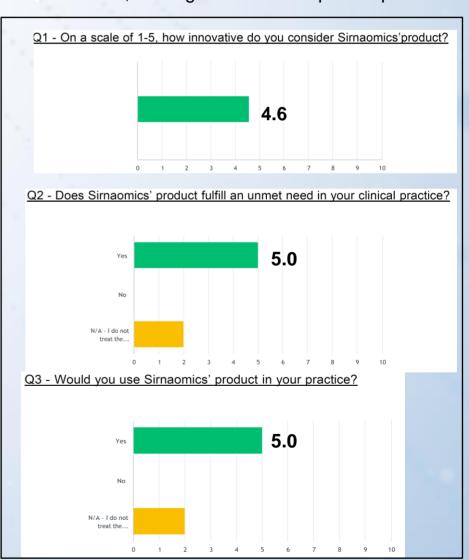


Result on STP705 isSCC Recognized by Peers





Survey: In a survey of nearly 2,000 dermatology clinicians, STP705 scored 4.6, 5.0 and 5.0 on a scale of 1 to 5, making it one of the top three products!





STP705 - isSCC Positive Phase IIb Interim Data



Professor Mark Nestor MD/PhD, University of Miami

- Positive Phase IIb Clinical Readouts for isSCC treatment
- Overall, 78% of subjects across all groups (32 subjects) achieved Histological Clearance
- Lowest dosage in study is identified at Cohort A (30 µg/ml) which achieved 89% histological clearance
- No significant cutaneous skin reactions and no treatment related AE's or SAE's, Skin Response Scores improved in 4/5 dosing cohorts and there were no dose limited toxicities noted in the study population

- The two-part, double-blind, randomized, placebo-controlled study to evaluate the safety and efficacy, administered as an intralesional injection in subjects with isSCC
- In the part-one of the study, treated 32 patients with 30 μg/ml, 60 μg/ml and 90 μg/ml of STP705 and 12 patients with 0 μg/ml placebo weekly for 6 week repeated dosing. This interim data is specifically for the study with total of 44 patients

	Histological Clearance		
Cohort A: 30 μg/ml N= 9	89%		
Cohort B: 60 μg/ml N= 12	75%		
Cohort C: 90 µg/ml N= 11	73%		
Cohort D: placebo group N= 12	58%		
Overall Treatment Result	78%		

Formulating communication with the U.S. FDA for late-stage clinical Study

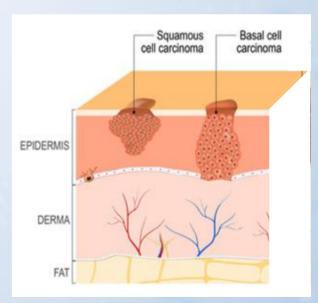


STP705 - Clinical Phase II Study for Treatment of BCC

Phase II in Progress

	Cohort A: 30 μg (N=5)	Cohort B: 60 μg (N=5)	Cohort C: 90 μg (N=5)	Cohort D: 120 μg (N=5)	Cohort E: 180 μg (N=5)	Cohort F: 240 μg (N=5)	
Histological Clearance	1/5	3/5	3/5	2/5	5/5	3/5	
	20%	60%	60%	40%	100%	60%	
Average Skin Response	Scores				انتتتتا		
Pre-treatment	3.2	2.8	2.6	Coore			
Post-treatment	2.4	2.6	2.6	Scores not reported until final report			

- Phase II, open label dose escalation study designed to evaluate the safety, tolerability and efficacy of various doses of STP705 administered as localized injection in patients with BCC. Total of 25 subjects which is divided equally among 5 cohorts (30, 60, 90, 120 and 180 μg dose level)
- Interim data achieves 100% response rate in the 180 µg dose level. The data showed improved or stable cosmetic result with an excellent safety profile (no adverse events) and no significant cutaneous skin reactions
- The additional completed group 6 (240 µg dose level) also showed **positive (60%** complete clearance) results
- Looking forward to mirror the promising data the potential to be an alternative to patients with BCC and other non-melanoma skin cancers who have an urgent need for new treatments



Reached optimum dosage, ready to move on to next phase of the study



STP705 - isSCC Advance to Late-Stage Study



IND 124844

MEETING MINUTES

Through communication with the U.S. FDA's scheduled Class B meeting (May 8, 2023) and the guidance provided in the legally binding minutes (June 8, 2023), Sirnaomics has confirmed the following basic protocol for addressing and advancing the Phase III clinical trial of STP705 for isSCC.

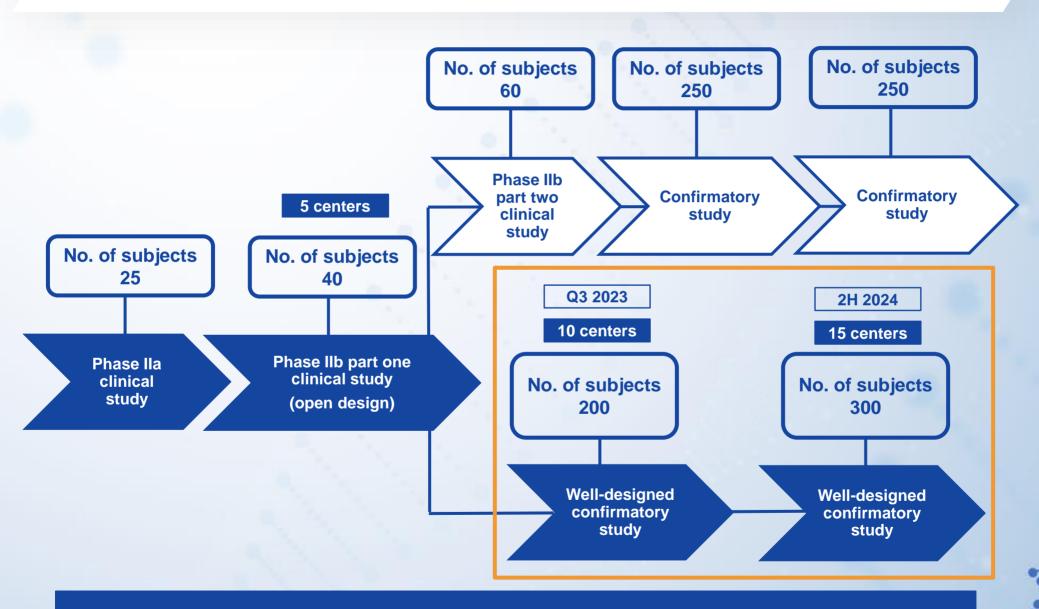
Sirnaomics is **well-positioned** currently to advance STP705 into a **confirmatory clinical study** for treatment of Squamous Cell Carcinoma in situ (isSCC).

We are preparing to move forward in 2023 with a **well-designed** single dosage study as a **sub-group** of subjects in a large Phase III clinical study.

The positive results would provide the basis for completion of this large registration Phase III trial.



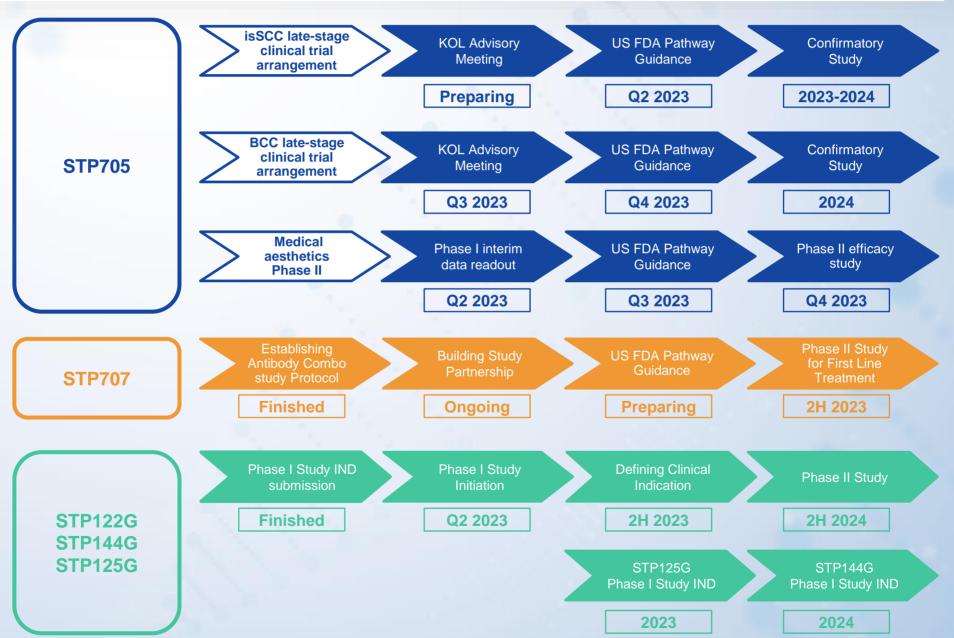
STP705 - isSCC Late-Stage Protocol



A clearer pathway through regulatory requirements for future medicine



Full Speed Ahead - Future Milestones







Q&A

