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Exicure Facts and Figures

- Technology originated at Northwestern University
- R&D Based outside Chicago, IL
- Shares outstanding: ~44 million
- Three drugs into clinical trials
- Cash runway into 2020
  - $22.2 MM cash at 3/31/19
Exicure at a Glance

- **Oncology: AST-008 Phase 1b/2 ongoing**
  - Expected Phase 1b/2 preliminary results in 2019

- **Genetic Disorders: Expansion in neurology and rare diseases**
  - Superior preclinical potency and favorable biodistribution forms basis for large new vertical
  - Non-human primate bio-distribution data coming in June of 2019
  - Targeting late 2019 to announce clinical candidate

- **Pursuing up-listing to NASDAQ**

- **Dermelix partnership pursuing rare dermatological conditions**
  - $1 million up front, $166 million in milestones, low double digit royalties
  - First indication is Netherton Syndrome
  - Dermelix has rights to pursue five additional indications
Exicure’s Proprietary Technology: Spherical Nucleic Acids (SNA)

- Synthesis of oligonucleotides + Scaffold from benign lipid nanoparticles → Generate SNA using Exicure process

- SNAs are dense, radial arrangements of synthetic nucleic acids on a nanoparticle
- Applicable for antisense, siRNA, miRNA, TLR9 modulators, splice-switching oligonucleotides
- Readily manufactured at clinical scale
Spherical Nucleic Acid (SNA) Solves Delivery Challenge

SNA technology has shown enhanced cellular uptake and enhanced cellular stability
SNA Technology is Uniquely Differentiated

<table>
<thead>
<tr>
<th>SNAs Enter Cells through Ubiquitous Scavenger Receptors</th>
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<tbody>
<tr>
<td>SNA architecture enables extra-hepatic delivery and increased half-life of oligos</td>
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<table>
<thead>
<tr>
<th>High Cell Uptake</th>
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<tbody>
<tr>
<td>✓ SNA facilitated cell uptake via scavenger receptors without need for encapsulation or complexation in vitro</td>
</tr>
<tr>
<td><em>PNAS, 2013, 110, p7625</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extra-hepatic Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ SNA effectively delivered topically into skin in vitro (human) and in vivo (mouse)</td>
</tr>
<tr>
<td><em>PNAS, 2012, 109, p11975</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increased Half-life of Oligos</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ SNA structure protected oligonucleotides from nuclease degradation, extending therapeutic half-life in vitro</td>
</tr>
<tr>
<td><em>Science, 2006, 312, p1027</em></td>
</tr>
</tbody>
</table>
Better Delivery Leads to Broader Applications

- SNAs activate immune cells in humans
- Potential as combination with checkpoint inhibitors, and/or other agents such as OX40 agonists
- SNAs knock down genes when topically applied to human skin
- Topical mRNA regulation/modification potentially applicable to over 200 dermatological conditions
- Demonstrated superior exon inclusion in patient cells when compared to nusinersen (Spinraza®)
- Superior potency improves survival and safety compared to nusinersen in vivo
- Demonstrated distribution to cornea and retina in vivo after intravitreal injection
- Induced target knock down and distribution in GI tissue after oral administration
- Demonstrated therapeutic activity in preclinical IBD models
- Potential for nebulized formulation of SNA
- Nebulized compound active in vitro and in vivo
- Up to 10-fold higher functional delivery after subcutaneous administration

SPINRAZA® is a registered trademark of Biogen
## Development Pipeline

<table>
<thead>
<tr>
<th>Therapeutic Area</th>
<th>Therapeutic Candidate/ Target</th>
<th>Indication</th>
<th>Development Stage</th>
<th>Status</th>
</tr>
</thead>
</table>
| **Immunology**   | **AST-008** (TLR9 agonist)   | Solid Tumors | Preclinical Development | • Phase 1b/2 opened **late 2018**(1)  
• 5 clinical sites open  
• Preliminary results in **2019** |
| Dermatology      | **XCUR17** (anti-IL17RA)      | Psoriasis(2) | Phase 2 | • Phase 1 topline results **announced late 2018** |
| **Neurology**    | **SMN2**                      | Spinal Muscular Atrophy | Phase 1 | • Superior potency **improves survival and safety** compared to nusinersen **in vivo** |
|                  | Multiple                      | Ataxias, Batten Disease, others | Preclinical Development | • Target identification and screening |
| Ophthalmology    | Undisclosed                   | Undisclosed | Preclinical Development | • Delivery to retina **in vivo** |
| Gastro-enterology| Undisclosed                   | Inflammatory Bowel Disease | Preclinical Development | • Target knockdown in tissue  
• Activity in mouse model of IBD |
| Pulmonology      | Undisclosed                   | Undisclosed | Preclinical Development | • Delivery via aerosol  
• Activity in mouse model |

**Partnered Program**

<table>
<thead>
<tr>
<th>Therapeutic Area</th>
<th>Therapeutic Candidate/ Target</th>
<th>Indication</th>
<th>Development Stage</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermatology</td>
<td><strong>Undisclosed</strong></td>
<td>Netherton Syndrome</td>
<td>Preclinical Development</td>
<td>• Candidate screening</td>
</tr>
<tr>
<td>Dermatology</td>
<td><strong>AST-005</strong> (anti-TNFα(3))</td>
<td>TBD</td>
<td>Phase 1b complete</td>
<td>• Phase 1b complete</td>
</tr>
</tbody>
</table>

(1) In combination with checkpoint inhibitors (2) Mild to moderate (3) In collaboration with Purdue Pharma
Cancer Immunotherapy is a Nobel Prize Winning Idea

- Immunotherapy is a breakthrough in cancer treatment
- Checkpoint inhibitors paved the way for immunotherapy

2018 Nobel Prize in Medicine Awarded to 2 Cancer Immunotherapy Researchers

The New York Times
Combination Therapy will be an Important Driver in Immuno-Oncology

- Checkpoint therapies fail when patients have an inadequate anti-tumor immune response
- TLR9 agonists turn “cold” tumors “hot” activating anti-tumor T-cells and Natural Killer Cells
- In combination with checkpoint inhibitors, activating TLR9 has led to significantly improved responses in both naïve and checkpoint inhibitor refractory patients
Exicure’s Clinical Program, AST-008 Shows Efficacy in a Variety of Preclinical Models

- Exicure’s SNA architecture may have advantages over other TLR9 agonists
  - Enter cells faster, more stable, and higher potency
5 Phase 1b/2 clinical sites open
- Dana Farber Cancer Institute
- Holden Comprehensive Cancer Center (U. of Iowa)
- Sylvester Comprehensive Cancer Center (U. of Miami)
- John Wayne Cancer Institute (Providence St. John's)
- University of Cincinnati

Highlights of Phase 1b/2 trial design
- Open label, intra-tumoral Phase 1b dose-finding lead-in followed by Phase 2 expansion
- Phase 1b enrollment expected 18 patients
- Objective: identify recommended Phase 2 dose, safety, PK, PD and efficacy
- Two-stage Phase 2 enrolling up to 29 patients; optional additional 10 patient cohort
- Objective: Safety, PK, PD, and efficacy read outs
- Prioritized cancers: Merkel cell carcinoma, cutaneous squamous cell carcinoma, melanoma, squamous cell carcinoma of the head and neck

Preliminary results expected in 2019

Evaluating investigator sponsored trials in combination with checkpoint inhibitors
Merkel Cell Carcinoma (MCC) is a Rare Skin Cancer

- **About 2,500 cases per year in the US**
- **Most aggressive skin cancer**
  - One third of patients die of the disease
  - Fatality rate exceeds that of melanoma
- **Opportunity for combination with checkpoint inhibitors**
  - Only avelumab and pembrolizumab are approved for use in metastatic MCC
  - Objective response is 32% and 56% for avelumab and pembro
  - Median progression-free survival after pembrolizumab therapy is 17 months
- **Rationale for AST-008**
  - MCC is immunogenic and responsive to activated immune system
  - Intratumoral infiltration by CD8+ T cells is associated with improved disease prognosis
    - Fewer than 20% of MCCs have substantial intratumoral infiltration of CD8+ T cells
  - Animal models show AST-008 induces CD8+ T cell infiltration
New Opportunities in Genetic Disorders

- **Neurological Genetic Disorders**
  - Diseases with genetically validated targets known but few disease modifying therapies exist
  - Not readily addressable by traditional therapeutic modalities
  - Significant unmet medical need in rare neurological disorders
    - Spinocerebellar ataxia type 3 (SCA3), SCA2, SCA1, Friedreich’s ataxia, Batten disease, Ataxia telangiectasia, Angelman syndrome and others

- **Exicure Opportunity**
  - Higher potency and longer persistence suggest advantages for frequency of dosing and therapeutic efficacy

- **First clinical candidate expected to be nominated in 2019**
Improving Potency: Spinal Muscular Atrophy

- SNA prolonged survival by four-fold (maximal survival of 115 days vs. 28 days for nusinersen-treated mice)
- SNA mitigated toxicity of nusinersen

Survival data presented at 2018 Annual Cure SMA Conference
 Longer Persistence Promises Less Frequent Dosing

- Exicure’s technology shows higher persistence in CNS and lower clearance through kidney compared to nusinersen
- Nusinersen SNAs doubled the levels of healthy full-length SMN2 mRNA and protein in SMA patient fibroblasts when compared to nusinersen
New Opportunities in Genetic Disorders

- **Ophthalmological Genetic Disorders**
  - Approximately 250 diseases with known genetic targets with few if any options for treatment
  - Rare diseases, which often lead to progressive loss of vision
  - Uniquely addressable with nucleic acid therapeutics

- **Exicure Opportunity**
  - Higher potency and longer persistence suggest advantages for frequency of dosing and therapeutic efficacy
  - Proprietary technology distributes to both posterior and anterior ocular structures, and exhibits higher distribution and longer persistence compared to linear oligonucleotide

- **Evaluating available indications with easily identifiable patient population and a clear path to market**
Enhanced Distribution and Persistence in Retinal Layers

- Exicure’s SNA technology may have important therapeutic benefits:
  - Distributes to both posterior and anterior ocular structures
  - Exhibits higher distribution than linear oligonucleotide
  - Persists longer compared to linear oligonucleotide
  - Does not cause inflammation in the eye
Inflammatory Diseases
○ XCUR17 is topically applied antisense oligonucleotide targeting IL-17 receptor

○ Phase 1 commenced April 2018 in patients with psoriasis
  ➢ 21 patients enrolled and completed dosing
  ➢ XCUR17 gel applied daily over 26 days

○ Eleven of twenty-one patients receiving the high strength XCUR17 gel showed an improvement in psoriasis symptoms (erythema, redness and induration)

○ Highest strength XCUR17 gel showed a statistically significant improvement in psoriasis symptoms versus the vehicle gel across the twenty-one patient cohort
  ➢ No XCUR17-related AEs were observed
  ➢ No relevant changes in mean psoriatic infiltrate thickness were observed for the three XCUR17 gels or the active ingredient-free vehicle gel
Rare Genetic Skin Disease Collaboration with Dermelix

- Targeting Netherton syndrome and up to five additional rare skin indications
- Initiated February 2019
- Up to $166 MM in development and clinical milestones per indication
  - $1 MM upfront/option per indication
  - All development funded by Dermelix
- Low double-digit royalties on annual net sales
Intellectual Property Portfolio

- Exclusive, worldwide license to make, use and sell SNAs for therapeutic applications
- IP portfolio includes over 60 issued or allowed patents and over 135 pending applications across multiple nucleic acid modalities
- Multiple layers of protection exist extending platform coverage beyond 2030

<table>
<thead>
<tr>
<th>Example Claim Classes</th>
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<tbody>
<tr>
<td><strong>Composition of Matter</strong></td>
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<tr>
<td>Methods of modulating nanoparticle uptake via oligonucleotide surface density</td>
</tr>
<tr>
<td>SNAs comprising cross-linked oligonucleotides</td>
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<tr>
<td>siRNA modified nanoparticles</td>
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<tr>
<td><strong>Mechanism of Action</strong></td>
</tr>
<tr>
<td>Antisense inhibition by oligonucleotides bound to inorganic nanoparticles</td>
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<tr>
<td>Immuno-modulatory SNAs</td>
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<tr>
<td><strong>Method of Use</strong></td>
</tr>
<tr>
<td>Administration of oligonucleotide functionalized nanoparticles to skin</td>
</tr>
<tr>
<td><strong>Drug Specific</strong></td>
</tr>
<tr>
<td>TNF antisense sequences and chemistries; AST-008; XCUR17</td>
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## Platform Encompasses All Mechanisms

<table>
<thead>
<tr>
<th></th>
<th>siRNA</th>
<th>Antisense</th>
<th>Splice Correction</th>
<th>TLR9 Activation</th>
<th>Market Cap¹ ($)</th>
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<tbody>
<tr>
<td>exicure</td>
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<td>✔</td>
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<td>786MM</td>
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</tbody>
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1. Market cap data from Yahoo Finance as of EOD May 31, 2019
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