Regenerative Medicine Platform

Osman Kibar, Ph.D. – CEO & Founder
September 17, 2016
Cell Differentiation – Healthy

Embryonic Stem Cells

- Zygote
- 2-cell
- 4-cell
- Morula
- Blastocyst

Progenitor Stem Cells

- Mesenchymal Stem Cells
- Dermal Stem Cells
- Cardiac Stem Cells
- Ependymal Stem Cells
- Etc.

Adult Cells

- Bone
- Cartilage
- Hair
- Skin
- Heart
- Neurons
- Etc.
Cell Differentiation – After birth

Progenitor Stem Cells

- Mesenchymal Stem Cells
- Dermal Stem Cells
- Cardiac Stem Cells
- Ependymal Stem Cells
- Etc.

Adult Cells

- Bone
- Cartilage
- Hair
- Skin
- Heart
- Neurons
- Etc.
Cell Differentiation – As we age

Progenitor Stem Cells

- Mesenchymal Stem Cells
  - Bone
  - Cartilage
- Dermal Stem Cells
  - Hair
  - Skin
- Cardiac Stem Cells
  - Heart
- Ependymal Stem Cells
  - Neurons
- Etc.

Adult Cells

ONE WAY
Samumed Platform: Reversing Aging and Injuries

- Repair and regenerate tissue via disease modification
- Target endogenous progenitor SCs via small molecules
Musculoskeletal Franchise
Osteoarthritis and Cartilage Regeneration

Normal Knee

Damaged Knee

Cartilage loss

Treated Knee

New & thicker cartilage

Model: Rat instability
Treatment: Single intra-articular (IA) injection
Results at: 12 weeks
Osteoarthritis: Joint Space Width (JSW)

Model: Phase 1 clinical trial
Treatment: Single IA injection
Results at: 24 weeks
Degenerative Disc Disease

Model: Rat degenerative intervertebral disc (IVD)
Treatment: Single Intra-discal injection
Results at: 8 weeks
Tendinopathy

Model: Rat intra-tendon collagenase-induced (Achilles tendon)
Treatment: Once-daily lotion
Results at: 3 weeks
Skin Franchise
Alopecia and Hair Growth

Model: CD1 mice, shave & nair
Treatment: Once daily lotion
Results at: 1 week
Alopecia and Hair Growth

Scalp Biopsy - Baseline
Scalp Biopsy - Treated

Model: Phase 2 clinical trial
Treatment: Once daily lotion
Results at: 90 days
Scleroderma

Model: Bleomycin-induced skin fibrosis
Treatment: Once-daily lotion for 2 wks (start 2wks post-bleomycin)
Results at: 4 weeks
Oncology and Fibrosis Franchise
Oncology and Wnt Cancers

Model: \( \text{APC}^{\text{min}} \) transgenic mice
Treatment: Twice-a-day oral
Results at: 4 weeks

Untreated

Treated with SM Drug
Model: Patient-derived xenograft
Treatment: Once-a-day oral
Results at: 4 weeks

Demonstrated activity in:
- Colon/colorectal cancer
- HCC
- Breast cancer
- Ovarian cancer
- Pancreatic cancer
- Acute myeloid leukemia
- B-cell CLL

Days of Treatment
Tumor Volume (mm³)
Vehicle 25 mg/kg, QD

70% TGI

Days of Treatment
Tumor Volume (mm³)
Vehicle 25 mg/kg, QD

55% TGI
Pulmonary Fibrosis and Reversing Scarring

Model: Bleomycin-induced pulmonary fibrosis
Treatment: Once-daily nebulizer
Results at: 4 weeks
Liver Fibrosis

Model: CCl₄-induced liver fibrosis
Treatment: Twice daily, oral
Results at: 5 weeks
Neuro Franchise
Alzheimer’s Disease and Reversing Dementia

Model: Transgenic mice (JNPL3), toxic amyloid-beta-induced
Treatment: Twice daily, oral
Results at: 12 weeks
Alzheimer’s Disease and Reversing Dementia

Model: Transgenic mice (JNPL3), toxic amyloid-beta-induced
Treatment: Twice daily, oral
Results at: 12 weeks

Motor Coordination
(wire grip test)

Spatial Memory
(Morris water maze test)

Time to reach platform (seconds)

Morris water maze test

Wild Type (Normal)
Treated w/ SM Drug
Vehicle

p=0.0003

Locomotor test (wire/grip)
combines score

Wild Type (Normal)
Treated w/ SM Drug
Vehicle
**Dry AMD and Reversing Vision Loss**

<table>
<thead>
<tr>
<th>Naïve Eye</th>
<th>Vehicle - Untreated</th>
<th>Treated with SM Drug</th>
</tr>
</thead>
</table>

**Model:** MNU-induced retinitis pigmentosa  
**Treatment:** Single intra-vitreal (IV) injection  
**Results at:** 3 weeks

Red = Rods  
Green = Cones
Spinal Cord Injury and Regeneration of Neural Tissue

Model: Mouse & Rat contusion injury (T9-T10 weight drop)
Treatment: Single injection at injury site
Results at: 8 weeks
Thank you