Natural Vascular Scaffolding (NVS)
to Restore and Maintain Femoropopliteal Luminal Patency in Peripheral Arterial Disease (PAD)
Disclosure

Speaker name:

William A. Gray MD

I have the following potential conflicts of interest to report:

☐ Consulting

☐ Employment in industry

☐ Stockholder of a healthcare company

☐ Owner of a healthcare company

☒ Other(s): Scientific Advisory Board member at Alucent Biomedical Inc.

☐ I do not have any potential conflict of interest
Components of NVS Therapy

Novel photoactivatable small molecule

Light fiber

Angioplasty balloon

Creates a *Natural Vascular Scaffold* through photoactivated linking of native structural proteins (i.e. collagen and elastin) in the vessel wall.
Photoactivated Linking of Extracellular Structural Proteins

Cross-links formed between amino acids (covalent chemical bonds)
NVS Therapy Targets Diseased Human Arteries Rich in Collagen

Fluorescent histological image of NVS compound in diseased human artery

Histological section of diseased human artery by H&E staining

Trichrome staining showing that diseased human arteries are rich in collagen
NVS Effect on Extracellular Matrix

Untreated

Treated

Conclusion

NVS increases the density of the treated vessel wall, indicating crosslinking in the media.
Recoil prevention is a clinically important effect.

Even a small difference in diameter carries physiological relevance, \((\text{Resistance} = 1 / \text{radius}^4)\).
Lack of In Vivo Recoil Following 30% Overstretch of Normal Pig Arteries
Retained Vascular Contractility of NVS Treated Human Arteries

Contraction to Thromboxane Mimetic

Relaxation to Sodium Nitroprusside
Lack of Restenosis in Chronic Study Using Hypercholesterolemic Swine

**Experimental design**
- Genetically engineered pigs kept on high cholesterol diet for a 1 year to develop disease
- Initial angioplasty stretch injury (3 x 30%) to produce stenosis
- 3 arm treatment @14 day: NVS in comparison to Stent and POBA
- OCT imaging and histology @ 28day after treatment

**Conclusions**
- The overall disease burden was low (compared to human PAD).
- Lumen size retained over 28days following NVS treatment
- NVS treatment does not cause restenotic injury like stents.
### Is NVS Therapy Innovative?

<table>
<thead>
<tr>
<th></th>
<th>POBA</th>
<th>Stents</th>
<th>NVS Therapy</th>
<th>Expected benefit from NVS therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumen Restoration</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Maintains the lumen for sustained</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>improvement of blood flow</td>
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<tr>
<td>Recoil Prevention</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Minimizes elastic recoil and helps the</td>
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<td></td>
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<td></td>
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<td>vessel recover from the insult of PTA</td>
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<tr>
<td>Vessel Elasticity</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Restored lumen retains more natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>anatomic and physiologic properties</td>
</tr>
<tr>
<td>Avoids Implant</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Eliminates stent-related complications</td>
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</tbody>
</table>
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