[0005] In some embodiments, design elements of the described devices and systems include maintenance of sterility of injected fluid; minimization of bubbles introduced to the inner ear; ability to deliver small volumes precisely at a controlled flow rate (for example, when coupled with the use of a standard pump); allowance for visualization of the round window membrane (RWM) during delivery through the external auditory canal by a surgeon; minimization of damage to the RWM, or to inner ear structures beyond the RWM; and minimization of test article leaking through the RWM.

[0006] In one aspect, the present disclosure provides a device to deliver fluid to an ear including: a handle portion including a proximal end and a distal end; a telescoping support coupled to the distal end of the handle portion; a needle sub-assembly coupled to the distal end of the handle portion and coupled to the distal end of the telescoping support, the needle sub-assembly including a bent needle, the bent needle including: an angled tip for piercing at least one membrane; and a bent portion; and tubing coupled to the proximal end of the handle portion. The bent needle extends through a hollow interior of the handle portion and fluidly connects directly to the tubing.

[0006a] In a second aspect, the present disclosure provides a system for delivering a therapeutic fluid to a portion of an inner ear of a patient comprising: means for developing a posterior tympanomeatal flap; means for creating an opening in a stapes footplate of the inner ear; and a fluid delivery device comprising a needle positioned at a distal end of the fluid delivery device, wherein the needle is configured to pierce a round window of the inner ear, wherein the fluid delivery device is configured to be positioned at a desired insertion depth within the round window; wherein the fluid delivery device is configured to deliver the therapeutic fluid to the inner ear, and wherein the therapeutic fluid comprises at least one viral gene therapy.

[0006b] In a third aspect, the present disclosure provides a system for delivering a therapeutic fluid to a portion of an inner ear of a patient comprising: means for performing a transcanal tympanotomy; means for preparing a round window of the patient; means for performing a laser-assisted micro-stapedotomy; a delivery device configured to inject the therapeutic fluid to the inner ear; means for applying sealant around at least one of the round window and an oval window of the patient; and means for lowering a tympanomeatal flap of the

patient to an anatomical position, wherein the means for performing the laser-assisted micro-stapedotomy comprises at least one of a KTP otologic laser and a CO_2 otologic laser, and wherein the therapeutic fluid comprises adeno-associated virus (AAV) vector that comprises an Anc80 AAV vector or a coding region encoding hOTOF.

[0007] In some embodiments, the device includes a telescoping support coupled to a proximal end of the needle sub-assembly.

[0008] In some embodiments, the distal end of the handle is coupled to a proximal end of the telescoping support.

[0009] In some embodiments, the telescoping support includes multiple nested hypotubes.

[0010] In some embodiments, the bent needle includes: an angled tip for piercing at least one membrane; and a bent portion.

[0011] In some embodiments, the device includes a strain relief feature coupled to the proximal end of the handle portion.

[0012] In some embodiments, the device includes a camera (for example, a distal tip camera). The distal tip camera is positioned within the needle sub-assembly.

[0013] In some embodiments, the tubing couples to the bent needle within a hollow interior of the handle portion.

[0014] In some embodiments, the device includes an inner diameter from about 0.005 inches to about 0.01 inches.