The Foundation of Better Hearing

AB Implantable Technology
The HiRes™ Ultra Cochlear Implant Family
The Foundation of Better Hearing

We at AB believe that many of your CI candidates are looking for an implant that gives them the best sound performance. We are committed to provide you with the best possible implants and services so you can make the optimal recommendation to your candidates. Their hearing and communication needs and circumstances determine what type of external solution may be best for them. We also help you to find the electrode that best fits their anatomy, making sure their implant does not interfere with the medical procedures they need.

For patients with moderate to profound or severe to profound hearing loss, the powerful innovations behind the cochlear implant, electrode, magnets and multi-magnet assembly, sound processor and wireless communication technologies inside the Advanced Bionics HiRes™ Bionic Ear System work together to provide a seamless foundation for a normal, full life with the best hearing possible.

Every aspect of our systems have been optimized for clarity, convenience and comfort. But what truly sets the HiRes™ Ultra CI family apart from other cochlear implants is its unsurpassed digital processing and sound delivery power. It’s designed to detect and deliver all the details and dimensions of sound information essential for natural perception, including intensity (loudness), frequency (pitch), and time.

And thanks to a unique delivery method called current steering, the HiRes Ultra CI system can deliver frequency information to 120 cochlear places at a rate of up to 83,000 updates per second¹ to automatically encode the widest range of intensities (up to 80 decibels).

Accessing this degree of spectral and temporal information, enables your patients to better understand tonal information in speech and music.²³⁴ Adult recipients will have the best opportunity to reconnect with the hearing world and children can have access to the best speech and language development possible.⁵⁶⁷
**Fully Synchronized Communication and Real-Time Processor Linking**  
Our proprietary Bidirectional Inductive Communication Link relays information about the functional status of your patient’s implant in real time from their electrode back to the sound processor. This closed loop ensures proper functioning of the system and optimal hearing performance through every type of sound environment.

**How Current Steering Delivers the Most Subtle Pitch Changes**  
Under advanced and proprietary software control, the 16 independent current sources of the AB implant can steer stimulation to 120 separate locations along the cochlea to dramatically increase the amount of frequency information that can be delivered.  
This enhanced spectral information allows recipients—regardless of their particular hearing loss physiology—to hear more pitches and more nuances of sound, which can improve speech understanding in noise, music appreciation, and tonal language perception. In fact, researchers have shown that AB cochlear implant recipients can hear up to 451 spectral bands (distinct pitches) across the electrode array with current steering technology.

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Current Steering allows AB implants to stimulate the Spiral Ganglion cell population between electrode contacts.
HiRes Ultra 3D Cochlear Implant

**Hassle Free MRI**
We at Advanced Bionics believe that an MRI procedure should be hassle free for you and your patients. The new, innovative multi-magnet assembly in the HiRes Ultra 3D CI provides 3D magnetic field alignment that allows adult and pediatric users to safely undergo high-resolution imaging, such as 3.0 Tesla MRIs, without any preparation, surgery or head bandaging.

This unique multi-magnet assembly is composed of 4 individual magnets that work to provide alignment to the 3D MRI field. If diagnostic procedures require a reduced-image artifact range, the multi-magnet assembly can be easily removed and replaced with a non-magnetic spacer through a small incision made prior to an MRI.

**Pain Free**
Going into an MRI tube is stressful, especially for your young patients. Our HiRes Ultra 3D cochlear implant requires no restriction on head orientation during an MRI, ensuring your patient a truly stress-free MRI experience.

The smooth movement of multi-magnet assembly generates such low torque that adults and pediatric recipients feel no pain or discomfort due to magnetic pulling during a high-resolution imaging MRI.
Uninterrupted Hearing
Eliminating the lengthy preparation procedures for a CI patient before an MRI saves time and hassle for you and for your patients.

With the HiRes Ultra 3D, you don’t need any special preparation for an MRI other than to ask your patients to take off their processor. When the scan is done, all they have to do is put their processor back on to return to hearing. With the HiRes Ultra 3D cochlear implant we provide your patients with uninterrupted hearing, which reduces the stress particularly with kids, who then have the ability to hear their parents right before and after the MRI scan.

Low Profile — High Impact Resistance
To make insertion easy and to provide flexibility for surgeons, the implant is designed for a shallow 1mm ramped recess to minimize required drilling and reduce surgery time. The thin 4.5mm profile and small footprint offers a discreet solution once implanted, making it suitable for both adults and children.

The HiRes Ultra exceeds the industry standard for impact resistance12,13,14 and allows patients to participate in everyday activities and sports without worry. All implant components are highly reliable and durable.15,16,17

The standard HiRes Ultra implant is approved for 1.5T MRI with the magnet in place — ready for the most widely recognized standard of care MRI procedure. A simple head bandage procedure utilizing an Antenna Coil Cover is all that is required if a patient needs to undergo MRI imaging — no surgical procedure is necessary. And if a high resolution 3T MRI scan is required, the standard HiRes Ultra CI is approved for 3T MRI following the simple magnet removal procedure.

The multi-magnet assembly in the HiRes Ultra 3D implant has been tested to keep working even after two hundred 3.0 Tesla MRI routines.15
HiFocus Electrodes

HiFocus Electrodes — Choice Without Compromised Performance
The HiRes Ultra implant offers two electrode designs, the straight HiFocus™ SlimJ electrode and the precurved HiFocus™ Mid-Scala electrode, to offer the surgeon a choice based on their practice preferences and the recipient’s anatomy. Both electrodes share the HiFocus design elements.

All HiFocus electrode contacts are encased in a slim flexible tapered silicone carrier to minimize insertion forces and damage to cochlear structures during surgery. They are all also designed with balanced stiffness, which allows for easy insertion within the scala tympani while making it less prone to bend upwards towards the basilar membrane and translocate.

Whichever you choose for your patient, both the HiFocus SlimJ or HiFocus Mid-Scala electrode offer maximum surgical flexibility and minimal cochlear disruption while maintaining patient performance and increasing their opportunity for better hearing outcomes.
HiFocus™ SlimJ Electrodes

The HiFocus SlimJ electrode is the latest approved electrode technology, designed for ease of handling and insertion. As a straight electrode with a gentle curvature, it can be smoothly and correctly inserted in the apical direction either using forceps or freehand.

Confidence of Insertion

The SlimJ electrode was designed with balanced stiffness and flexibility to offer easier handling and smoother insertion in order to protect cochlear structures. The wing feature gives you a better way to hold and control the electrode, even into the facial recess. This offers more precise control of the angle and speed of insertion and the best possible visualization of the cochlea.

The HiFocus SlimJ electrode can be introduced into the cochlea by a surgeon’s preferred approach — using round window, extended round window, or small cochleostomy, requiring only a 0.8mm opening. The tip feature is intended to ease the insertion through the round window.

“Brilliant electrode design, easy to insert without any resistance maintaining the right orientation, resistant to rotation, and fills the round window beautifully.”
— Sherif Khalil, MD, Royal National Throat Nose and Ear Hospital Cochlear Implant Programme, UK
**Full Spectral Coverage**

A marker provides visual indication of insertion depth — the 23mm indicator represents approximately 420° in a standard cochlea, covering the main spiral ganglion population²³ to provide optimal spectral coverage.

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**Cochlear Structure Preservation**

The HiFocus SlimJ electrode is designed to minimize trauma to the delicate cochlear structures and can be inserted and reinserted up to three times. Studies have shown that recipient hearing outcomes are strongest when cochlear structures are preserved and undamaged by the electrode insertion.¹⁸,²¹,²²,²³

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“The results are remarkable. Based on our multi-center studies over the past 18 years, the HiFocus SlimJ preserves cochlear structures better than any other lateral wall electrode tested to date.”

— Steve Rebscher, Specialist, Department of Otolaryngology, School of Medicine, University of California, San Francisco
HiFocus™ Mid-Scala Electrodes

The HiFocus Mid-Scala electrode is the smallest styleted, pre-curved electrode on the market. Designed to conform to the cochlea’s natural contours, it maintains a consistent positioning in the mid-scala of the scala tympani and helps protect the delicate cochlea structures during insertion.

**Consistency of Placement**

The primary differences between the HiFocus Mid-Scala electrode and the HiFocus SlimJ designs are the HiFocus Mid-Scala’s precurved shape, which allows it to be inserted consistently with minimal cochlea trauma,¹⁹ and its straight tip region, helps avoid tip fold overs and allows for the electrode to be loaded on a dedicated insertion tool to support a controlled insertion, if desired.

The HiFocus Mid-Scala electrode can be introduced into the cochlea by a surgeon’s preferred approach — freehand or by use of the insertion tool. It can be inserted through the round window, extended round window, or small cochleostomy approach, requiring only a 0.8mm opening. The tip feature is intended to ease the insertion through the round window.

The distal blue marker can be used to ensure the electrode is properly positioned prior to the off-stylet technique, thus avoiding tip fold over issues. The proximal blue marker provides a visual indication of a ‘full’ insertion depth — representing approximately 420° angular insertion in a standard cochlea, covering the main spiral ganglion population²³ for optimal spectral coverage.

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Only pre-curved electrode designed for an easy, controlled, one-hand insertion.  
Tapered straight tip for easy Round Window insertion and no tip fold over.

Only electrode in the market designed to be placed mid-scala
**Full Spectral Coverage**
The length and curvature of the HiFocus Mid-Scala allows for proven consistency of full spectral coverage with approximately 420° insertion depth signifying coverage of main Spiral Ganglion cell population\(^{23}\) with a tight standard deviation of 20.7°.

![Distribution of Insertion Depths](image)

*Graph showing angular insertion depths of HiFocus Mid-Scala across 35 samples\(^ {24}\)*

**Cochlear Structure Preservation**
The shape of the HiFocus Mid-Scala places the electrode within the scala tympani, close to the spiral ganglion cells to enable maximum performance\(^ {18,23}\). Its dimensions are optimized to increase fit within the scala tympani to protect the delicate structures of the cochlea\(^ {20}\) whilst avoiding damage to the modiolus, osseous spiral lamina and the basilar membrane\(^ {20,25,26}\). In addition, being located central to perimodiolar, gives the HiFocus Mid-Scala an ideal basal placement for high frequencies\(^ {25}\).

Like the SlimJ, the HiFocus Mid-Scala electrode can also be inserted and reinserted up to three times.

![Histology showing HiFocus Mid-Scala electrode ideally positioned in the middle of the scala tympani.](image)
A Powerful Combination: Complete AB-Phonak Hearing Solutions for Your Patient

Together with Phonak, the world leader in power and pediatric hearing aids, we offer patients complete solutions.

Connecting to the Full World of Sounds
To enjoy the world of hearing, a sound processor capable of automatically adapting to any type of environment is needed. The Naida CI sound processor from Advanced Bionics includes directional microphones, intuitive onboard controls and the T-Mic2™ microphone, the only in-ear CI microphone that reproduces natural sound quality. The Naida CI also employs the full power of Phonak front-end signal processing, allowing recipients to effortlessly transition across challenging environments. From a whispered conversation, to a noisy restaurant, to an outdoor event on a windy day, the Naida CI sound processor is designed to help the recipient hear their best wherever they are.

Custom Solutions Made Easy
The Naida CI sound processor comes standard with Binaural VoiceStream Technology™ (BVST), a technology which enables devices from Advanced Bionics and Phonak to automatically establish a wireless ear-to-ear network for sharing of sound and controls. This network provides bilateral, bimodal, and unilateral listeners with a simple, custom solution for their current hearing configuration, that can easily transition to an alternate solution, should that configuration change over time—making your patient’s implant solution future-proof and easily upgradable without need for additional surgery.
The Naída CI Q90 can be programmed to work with another Naída CI sound processor, the Phonak Naída™ Link hearing aid, or a Phonak Naída™ Link CROS device. For recipients who can use low frequency acoustic amplification in the implanted ear, the Naída CI Q90 processor can be converted to an all-in-one solution by simply adding a Phonak acoustic earhook. This gives the recipient the best combination of Advanced Bionics and Phonak technology in the same ear.

**Roger for Better Hearing in Noise and Over Distance**
The Naída CI Q90 cochlear implant system is fully compatible with Phonak Roger technology, the world’s leading solution for superior speech-in-noise and over distance performance. It’s ideal for an all-inclusive listening experience including Bluetooth connectivity to streaming music or video devices and smart phones, as well as additional remote microphone options and integrated wireless receiver systems.
1. Ruckenstein, Michael (2012) Cochlear Implants and Other Implantable Hearing Devices


5. Levitin, Daniel (2007) - This is your brain on music, the science of a human obsession


17. 2018 Cochlear Implant Reliability Report, PN 027-N025-02 RevB


24. HiFocus™ Mid-Scala Electrode Design, PN 028-M224-03 RevC


For more information, visit AdvancedBionics.com.