

Frequently Asked Questions DESIGNED FOR AUD STUDENTS



Looking for answers about AB's technology?

This resource is designed for AuD students working on projects associated with university programs.



General Questions

WHAT IS A COCHLEAR IMPLANT?

A cochlear implant is a highly advanced medical device designed to provide access to sound to those who do not benefit from traditional amplification. Cochlear implants bypass damaged portions of the ear and directly stimulate the auditory nerve. Signals generated by the implant are sent by way of the auditory nerve to the brain, which recognizes the signals as sound.

WHAT ARE YOUR CANDIDACY REQUIREMENTS?

Candidacy criteria is set by the FDA and are different for adults and children.

Adults: Must be 18 years or older, have a profound bilateral sensorineural hearing loss, hearing loss must be post-lingual and the candidate must receive limited benefit from hearing aids. Open-set sentence recognition scores must be <50%.

Children: 12 months –17 years of age, profound bilateral sensorineural hearing loss, have had a trial period with appropriately-fitted hearing aids, little or no benefit from hearing aids. For older children, they must produce scores less than or equal to 12% on difficult open-set word recognition test and <30% on open-set sentence tests.

[Click here for more information](#)

WHAT ARE THE COMPONENTS OF A COCHLEAR IMPLANT SYSTEM?

There are two main components to a cochlear implant system. The internal device is surgically implanted. The external portion includes the head piece, and the sound processor, which sits behind the ear.

[Click here for more information](#)

WHO CAN GET AN ADVANCED BIONICS COCHLEAR IMPLANT?

Candidates who meet the FDA approved candidacy criteria are eligible for a cochlear implant. A cochlear implant team, often made up of surgeons, audiologists, speech language pathologist, and other professionals, will take other things into consideration, such as medical history and family support, to determine if a cochlea implant is the proper course of action for a candidate.

[Click here for more information](#)

General Questions

HOW DOES A CI WORK?

The cochlear implant sound processor captures sound, using one or more microphones. AB has microphones placed at the opening of the ear canal, in the front and back of the processor, and in the headpiece. The sound processor converts acoustic sound into digital signal that is transmitted to the internal component. This electric signal is sent to the cochlea via the electrode array. The electrodes stimulate the hearing nerve and the brain uses these signals and interprets them as sound.

[Click here for a video](#)

Internal Component

WHAT IS THE ELECTRODE?

An electrode array is a component of the internal implant that transmits electric signals from the implant to the auditory nerve. AB's electrode arrays are designed for a gentle cochlear insertion and delivers 120 spectral bands of sound to help recipients understand speech and enjoy music.

The HiRes Ultra implant offers two electrode designs, the straight HiFocus™ SlimJ electrode and the precurved HiFocus™ Mid-Scala electrode, to give the surgeon a choice based on their practice preferences and the recipient's anatomy. Both electrodes share the HiFocus design elements.

[Click here](#) and [here](#) for more information

WHICH ELECTRODE HAS BETTER OUTCOMES?

The HiFocus SlimJ or HiFocus Mid-Scala electrode provide the surgeon with maximum surgical flexibility based upon surgical preference while maintaining patient performance.^{1,2,3}

Internal Component

HOW DOES THE INTERNAL DEVICE WORK?

Acoustical sound captured by the sound processor is sent to the internal component where it is converted from acoustical sound to an electric signal. This electric signal is sent to the cochlea via the electrode array. The electrodes stimulate the hearing nerve and the brain interprets these signals as sound.

[Click here for a video](#)

IS IT POSSIBLE TO MONITOR THE FUNCTION OF THE COCHLEA DURING ELECTRODE INSERTION?

Yes, the AIM system uses the implant to measure electrocochleography, or ECochG, potentials generated by the inner ear and the auditory nerve in response to acoustic stimuli. This continuous and real-time measurement during electrode insertion provides valuable feedback.

Post-operatively, the AIM system can also perform objective audiometry, as well as NRI, ESRT, and impedance measurements without patient interaction.

HOW IS THE AB INTERNAL DEVICE DIFFERENT THAN COMPETITOR DEVICES?

There are two key differences between our internal device in comparison to other internal devices on the market.

First, the HiRes™ Ultra 3D cochlear implant is MRI-safe. It was developed in collaboration with leading cochlear implant surgeons to meet the surgical need and those of the recipient. AB's innovative multi-magnet assembly in the HiRes Ultra 3D implant provides alignment to the external MRI magnetic field, allowing recipients to safely undergo high-resolution imaging, such as 3.0 Tesla MRIs, without any preparation, surgery or head bandaging.

Second, AB's internal implants have 16 independent output circuits, one for each of the 16 electrodes. The 16 independent current sources of the AB implant can steer stimulation to 120 separate locations along the cochlea, thereby increasing the amount of frequency information that can be delivered.

[Click here for a blog post that includes more information](#)

External Component

WHAT IS AB'S CURRENT SOUND PROCESSOR?

AB currently has two sound processors, one for adults and one for pediatrics.

AB's current sound processor for adults is Naída CI M90.

AB's sound processor for pediatrics is Sky CI M.

Both processors use unique operating systems. Naida CI M uses AutoSense OS and Sky CI M uses AutoSense Sky OS. AutoSense OS uses artificial intelligence to automatically manage background noise, loud voices, reverberation, wind noise, whispers, etc. to create the perfect program settings for recipients from moment to moment. This means recipients have the best access to speech at all times without the need to touch their program button.

[Click here for more information](#)

WHAT BATTERY OPTIONS DOES AB PROVIDE?

Advanced Bionics offers several choices of battery options for recipients. Recipients can choose from a curved or straight battery option. They can also select batteries based on size options: small, medium, large, standard, and M Zn-Air Battery.

AB also offers recipients the option to use the M Waterproof battery, a fully waterproof and dust-tight battery that provides recipients with the same great hearing while allowing them to enjoy even the most adventurous activities.

Battery life may vary based on the Marvel CI sound processor settings, duration of wireless streaming, and age of the battery. Expected battery life is as follows:

Small: less than or equal to 9 hours

Medium: less than or equal to 16 hours

Large: less than or equal to 23 hours

Standard: less than or equal to 16 hours

M Waterproof: less than or equal to 18 hours

M Zn-Air Battery: less than or equal to 16 hours

[Click here for more information](#)

External Component

WHAT CONNECTIVITY OPTIONS DOES AB PROVIDE?

The Naída CI M (Marvel) offers a variety of ways to connect.

- Built-in Bluetooth Classic means recipients are not limited on the devices they can pair directly to their CI. Only with AB can recipients connect to all Apple and Android devices, including laptops and smart TVs, with no added equipment or accessories. The Marvel CI can remember 2 pairings to make switching between different devices easy!
- The only true hands-free calling available today! With our microphones that pick up the recipient's voice, recipients can answer a call and enjoy 2-way conversations without ever taking their phone out of their pocket.
- AB Remote app allows recipients to easily control their sound processor. The AB Remote app provides recipients with convenient management of their AB and Phonak hearing devices from one smartphone.
- Phonak direct streaming accessories means that recipients can benefit from the full range of Phonak accessories that stream directly to our sound processor and compatible hearing aids, including the amazing Phonak Roger technology.

[Click here for more information](#)

WHAT OTHER ACCESSORIES DOES AB PROVIDE?

Phonak Roger On iN

- A wireless microphone for everyday use in noise and over distance
- Roger On iN has the capability to install Roger receivers directly into the Marvel CI, as well as Naída Link M and Sky Link M hearing aid – meaning NO external receivers!
- Multiple uses: restaurants, streaming audio (i.e. Zoom meetings), TV (by using the provided docking station), sports and recreation, places of worship, and so much more

Phonak TV Connector

- A wireless accessory that streams TV and music directly to Marvel CI technology using Bluetooth technology

Phonak PartnerMic

- A discreet and easy to use microphone that attaches to a partner's lapel to improve hearing during one-on-one conversations (restaurants, car rides, walking side by side, etc)

Phonak Remote Control

- A simple, handheld remote made to easily control Marvel CI devices without fumbling or being distracted

Sound Processing Strategies

WHAT IS AB'S SOUND PROCESSING STRATEGY?

AB offers the most cutting-edge, sophisticated sound processing for high-performance hearing. This upgradeable technology is designed with one unwavering goal in mind: to help CI recipients hear their best in virtually any environment, from a quiet office cubicle to a loud classroom. Marvel CI sound processors combine AB innovations with technology from Phonak, the world leader in hearing aid solutions, to help you hear your best wherever you go.

Designed to provide hearing that closely resembles how a normal ear hears, AB's HiRes Fidelity 120™ sound processing captures and delivers the full dimension of sound for a more complete hearing experience.

Only HiRes Fidelity 120 offers five times more sound resolution than any other cochlear implant system – 120 spectral bands – to help CI recipients hear all the colorful details of sound: birds chirping, rain falling, the various layers of music. And with HiRes Fidelity 120, CI recipients have the opportunity to hear all the details necessary to understand speech and develop strong language skills.

[Click here for a video](#)

WHAT FREQUENCIES DOES AB TECHNOLOGY PROVIDE TO CI RECIPIENTS?

It's very difficult to give an exact range, given individual differences in cochlear anatomy and electrode array insertion. Almost all recipients reach normal or near-normal thresholds across the entire audiogram 250-8000 Hz, and most recipients can hear the lowest key on a piano, which is about 27.5 Hz.

[Click here for more information](#)

Sound Processing Strategies

DOES AB HAVE NOISE REDUCTION TECHNOLOGY?

Built on AB's proprietary HiRes Fidelity 120 technology, ClearVoice has been designed to automatically analyze and adapt to each listening situation that a recipient encounters throughout the day, separating the distracting noises from what recipients want to hear most—speech.

This sophisticated technology has been developed to help CI recipients communicate clearly and easily in challenging listening situations, including restaurants, cars and classrooms — without making adjustments to the sound processor.

In addition, Marvel CI uses AutoSense OS, proprietary technology from Phonak that gives recipients a powerful hearing experience by providing automatic access to a variety of features which customize sound based on their environment. This means that recipients can hear their best every moment, every day, and in every environment (including in noise).

[Click here for a video](#)

[Click here for more information about AutoSense](#)

1. Rivas A, Isaacson B, Kim A, Driscoll C, Cullen R, Rebscher S, (2017) New Lateral Wall Electrode, Evaluation of Surgical Handling, Radiological Placement, and Histological Appraisal of Insertion Trauma , San Francisco, July 26 -29, 2017.
2. Hassepass F, Bulla S, Maier W, Laszig R, Arndt S, Beck R, Traser L, Aschendorff A; The New Mid-Scala Electrode Array: A Radiologic And Histologic Study In Human Temporal Bones. *Otology & Neurotology* 2014; 35(8):1415-20.
3. van der Jagt MA1, Briaire JJ, Verbist BM, Frijns JH., Comparison of the HiFocus Mid-Scala and HiFocus 1J Electrode Array: Angular Insertion Depths and Speech Perception Outcomes., *Audiol Neurootol*. 2016;21(5):316-325. doi: 10.1159/000448581. Epub 2016 Nov 21.