

## Learning for Life Summary 10-28-20

### Topic: Music and the Brain

### Speaker: Renee Fleming

What a special treat to hear from Renee Fleming, an American icon in the opera world who also has a passion for science! Renee introduced herself as the child of a family of coal miners. Her father was the first to go to college because he played the trumpet and inspired her interest in music, and what an inspiration that was. She sings throughout the world and acknowledges her privileged life and experiences which she utilizes to promote the intersection of the arts and science.

Renee described her early connection between the power of songs and memory when she shared the story of her husband's aunt who was suffering from dementia yet could remember and sing songs from her childhood even after she lost her ability to hold routine conversations with others. However, it was her own experiences with stage fright that triggered her interest in the mind/body connection, particularly how music might affect the brain. A fortunate partnership with Dr. Frances Collins, head of the NIH sprung from a contentious dinner party with chief justices Ginsberg, Scalia and Kennedy the night after marriage equality was supported by the court. Dr. Collins accompanied Renee on his guitar as she sang "The Times They Are A-changin'" and a collaboration between the NIH and the Kennedy Center for the Arts for which Renee was the recently appointed artistic director was launched. The partnership between the Kennedy Center and the NIH resulted in well received program called **Sound Health: Music and Mind**.

Renee then shared multiple examples of ongoing studies evaluating the brain's functional response to music including neuroimaging examples of the brain's activity to routine speech and to singing, the latter lighting up many more areas of the brain including even the visual cortex! Singing and music activate the brain in more ways than anyone had expected. In order to gain a deeper understanding of why this may be, Renee shared her exploration of human evolution and the history of music in human civilization. Our ancestors had the same vocal mechanism for half a million years, and music most likely predated language. Since we don't evolve that quickly, music is a deeply engrained trait within us. Examples of animals and infants responding to music illustrated her points.

Then turning to the power of music as therapy, we heard about the positive relationship of school music programs with higher student achievement, better language and problem-solving skills and even decreased aggression and hyperactivity. Unfortunately, schools in areas of poverty, often in communities of color, have fewer music programs, and the implications of exacerbating the achievement gap are obvious. Furthermore, the power of music and art to treat certain conditions like stuttering, Alzheimer's, chronic pain, and even heart disease was demonstrated to the audience with powerful short videos of people responding to music therapy and descriptions of ongoing programs in medical facilities and nursing homes.

Probably the most moving video was of a woman with severe Parkinson's disease who had serious difficulty walking, but when instead she started dancing, she was quite fluid, and moved easily, most likely because different neural circuits were being used to result in movement. It was quite emotional when this seriously challenged woman described the confidence she gained through dance.

Renee ended this powerful hour by sharing the importance of ongoing research to:

- understand how the brain processes music,
- identify strategies to enhance normal brain development and function, and
- to develop musical interventions for brain diseases and human health overall.

Her concluding words: "Music has the power to heal hearts. We are emotional, social and creative beings who need each other in this divided world." Maybe now more than ever.

Take Home Points:

1. Song and music are deeply engrained traits in humans that engage the brain in ways that may be much more powerful than simple conversation or visual images.
2. Functional neuroimaging allows us to see how the brain may process music, but more studies are needed.
3. The therapeutic possibilities of music and art therapy range from psychiatric illness, to neurologic disease to student achievement.