

## BIOLOGY CONNECTIONS

### Lesson 4: What Occurs When Our Voice Changes? How Do We Care For Our Voice?

#### Prior Knowledge:

In our last lesson we built our own vocal folds and explored how they work. We also learned about how the cords are flexible and sturdy so they produce sound.

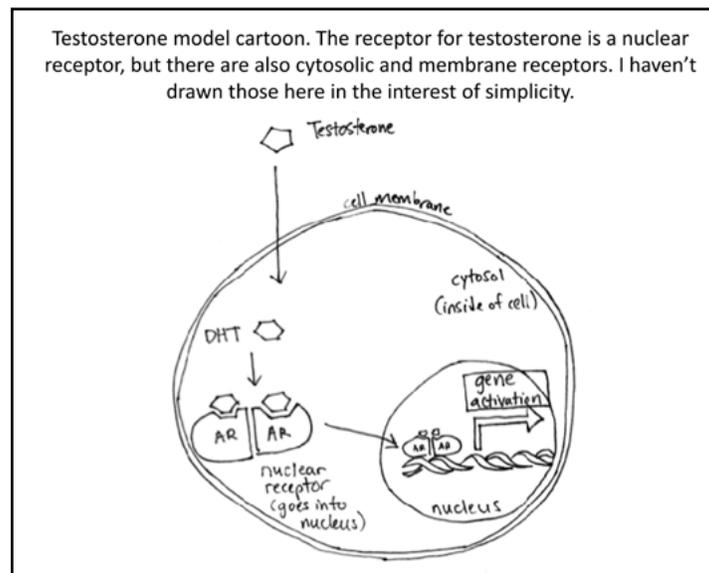
#### Big Ideas:

When we hear the human voice we get many clues about the speaker. We can tell their age, their health, gender and how they feel emotionally. How do we care for our voice whether we are singers or not?

#### Lesson:

Through our lives our voices will change radically. The three biggest changes occur when; babies begin to speak at about 11 months of age, when the voice changes at about the age of thirteen, and finally with the onset of old age.

When babies are born, their vocal system is not completely formed. At about 11 months old the folds begin to develop the five layers we discussed in lesson #3. The biggest change happens around 13 years of age with the onset of puberty. As hormones are secreted into the bloodstream, they affect various organs and tissues. The hormones bind to receptors and stimulate a change.



This hormone is testosterone. Testosterone triggers a boy's voice to deepen. As the larynx grows larger, the voice develops a lower range. When this surge of testosterone is coursing through a young man's body, to make the larynx grow, some cracking or breaking is normal. This is a biological change as the diaphragm, larynx and cords all get adjusted to their new size. Men with a large larynx will have a deeper voice because their vocal cords are bigger. The cords take up more space and create more resonance. Men's voices don't reach maturity until they are in their twenties.

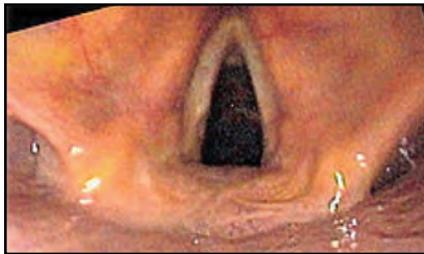
### *Try This!*

As your vocal cords grow with age it causes your voice to deepen. Wrap a rubber band around the fingers of both hands and stretch. Change the length of band stretched by wrapping it more or less times around your fingers, and have a friend flick it each time. What do you observe about the sound each size makes? A longer band produces lower pitch and your vocal cords do the same thing. Bigger and longer cords make a lower pitch.

### Vocal Health:

Active teenagers use their voices all the time. We shout at a sports event, sing to the radio, or yell to a friend down the hall. Teenagers are also using their voices in class, as athletes and as performers. Many times by the end of the day, the voice is exhausted from overuse. Also being around cigarette smoke, using alcohol or drugs can negatively impact the voice.

### Visuals



Healthy



Polyps



Nodes

Vocal cords can become irritated for a variety of reasons and may lead to polyps or nodes, which negatively affect the speaking and singing voice. These irritants create a sore and eventually a callus scar on the **vocalis ligament**, the parallel edge of the vocal fold. The ligament becomes stiff and loses its flexibility. When this happens the voice can become tired and breathy. These types of injuries are difficult to detect and treat so the best plan is to avoid injury to these important muscles. Remember they are only about the size of a nickel.

## Vocal Exercises: *Try These!*

### Stretch

- Stick out your tongue as far as possible in as many directions as possible.
- Exaggerate expressions on your face.
- Place your hands on either side of your jaw muscles, massage them and gently pull the jaw muscles down for a good stretch. Think of your jaw muscles as rubber bands holding your jaw in place.
- Lift the soft palate by yawning, hold the lift for a moment, and then relax.

### Support/Placement

- Sit up straight, take in a deep breath, hold it for a 10 count, then slowly release it.
- Take in a big breath, hum for a 10 count, and then exhale. Repeat and extend the length of the count.
- To find your perfect vocal placement, sigh. After your sigh, phonate with a hum, gently run the hum up and down your vocal range. When you speak match that placement you found when sighing in your speaking voice.

### Relax

- Gently massage your whole face, head and neck.
- Trade shoulder massages with a friend.
- Let your jaw and tongue completely relax.
- Take in a big breath, hold it for a moment and then exhale.
- Lift your shoulders to your ears, and then drop them.

### Also

- If you need to call out to get someone's attention, bellow instead of shouting. You can also cup your hand to the side of your lips to get your voice to go further.
- Turn down the volume of your radio when you are singing along. This helps avoid straining your voice in the car.
- Avoid talking directly on your vocal cords; this causes strain and vocal fry. Use your chest voice when you speak normally.
- Don't smoke and stay away from people who do smoke.
- Drink lots of water throughout the day.

## Next Steps

Develop an awareness of your own voice. What causes your voice to feel tired? Listen to how people around you speak. Do their voices sound rested or tired?

*Special thanks to Chrissy Johnson, Speech Therapist*