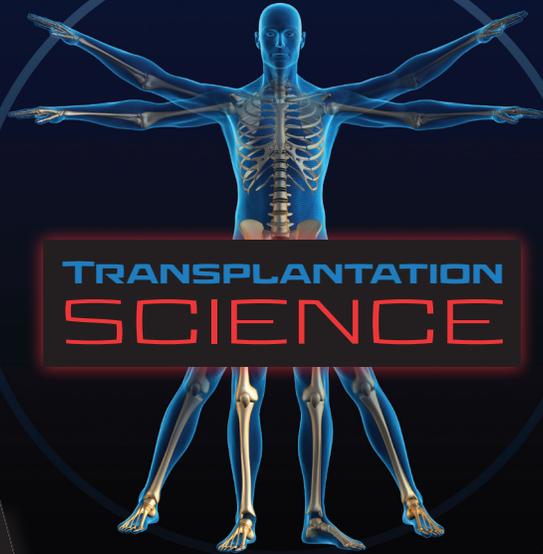
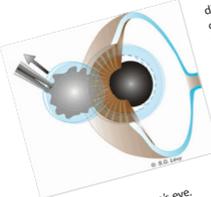


# TRANSPLANTATION SCIENCE



## CORNEA

### CORNEAL TRANSPLANTS



Any number of events, from a corneal disease to irreparable damage from trauma, could generate the need for a corneal transplant. During a transplant, the surgeon delicately removes the damaged or diseased cornea from the patient's eye using surgical instruments.

The surgeon replaces the old cornea with the donated cornea, which is prepared to fit perfectly into the patient's eye.

The surgeon uses very fine stitches to sew the new cornea into the patient's eye. The stitches are left there until the cornea has bonded completely to the eye. The surgeon can also periodically adjust the stitches to help shape the cornea to fit the patient to see better through it. The stitches are 28 microns (m) thick! (See handout on microns to see just how small these glasses which simulate corneal fit



Please locate the glasses on the table at these glasses which simulate corneal fit decide if you would want a transplant if

## THE FACTS ABOUT ORGAN, EYE & TISSUE DONATION

### TISSUES, BONE & SKIN

Here are several examples of how one donor can help save and heal the lives of many:

#### Anterior cruciate ligament (ACL) surgery (Non bone Tendon)

Anterior cruciate ligament (ACL) reconstruction is surgery to repair a tear in an ACL, the most common of the major ligaments in the knee. Sports and fitness routines that involve running, pivoting, turning and jumping lead to many torn ACLs. The ACL is one of the main stabilizing ligaments of the knee. It prevents the lower leg bone (tibial) from going too far forward. Once torn, the ACL won't heal, so fusing the torn ligament's function is not restored. ACL reconstruction involves creating a new ACL from grafted tissue, usually a non-bone tendon graft or a bone-tendon-bone graft.



#### Spinal Fusion Surgery (Machined Graft)

Spinal fusion is surgery to permanently connect two or more vertebrae in the spine, eliminating motion between them. Spinal fusion involves placing extra bone (bone graft) to fill the space between two vertebrae. The bone graft material used in spinal fusion can be a preformed shape, or it may be contained in a fiber or metal cage. Plates, screws and bolts hold the vertebrae together.



## LIVER

### HOW IT WORKS

The **LIVER** is one of the largest and most complex organs in the body. It weighs about 3.3 pounds in adults and is made up of a spongy mass of wedge-shaped lobes, that are necessary for life. The liver helps process carbohydrates, fats and proteins, and stores vitamins. It processes nutrients absorbed from food in the intestines and turns them into materials that the body needs for life.

For example, it makes the blood needs for clotting. It also secretes bile to help digest fats, and breaks down toxic substances in the blood such as drugs and alcohol. The liver is also responsible for the metabolism of



### COMMON DISEASES THAT MAY LEAD TO TRANSPLANTATION

#### CIRRHOSIS

Cirrhosis refers to scarring of the liver. Scar tissue forms because of injury or long-term disease. It replaces healthy tissue. Scar tissue cannot do what healthy liver tissue does - make protein, help fight infections, clean the blood, help digest food, and store energy for when you need it. Scar tissue also blocks the normal flow of blood through the liver. Causes of cirrhosis of the liver include Hepatitis C infection and long-term alcohol abuse.

#### PRIMARY BILIARY CIRRHOSIS

Primary biliary cirrhosis, often abbreviated PBC, is an autoimmune disease of the liver marked by the slow progressive destruction of the small bile ducts (bile canaliculi) within the liver. When these ducts are damaged, bile builds up in the liver (cholestasis) over time damages the tissue. This can lead to scarring, fibrosis and cirrhosis. It was previously thought to be a rare disease, but recent studies have shown that

## STATION 2 WORKSHEET

### EXERCISE

Base your decision upon science not emotion.

#### BACKGROUND OF DONOR

A young man who lives in Denver, Colorado suffers a brain injury caused by a motorcycle accident. He is pronounced brain dead at a local hospital and his heart is now available for transplant. He is 30 years old, 6 feet tall, approximately 155 pounds. You have 6 people who are potential matches to the donor. Using the criteria listed below, determine which candidate is best to receive this heart.

#### CRITERIA

##### Height and weight (body size)

Are there any candidates that are simply the wrong size to receive this organ? If so, you must rule them out and they must continue to wait for a better match.

REMEMBER: A person's heart is roughly the size of their closed fist. Imagine how large each of the candidates hearts would be. The size of the heart they receive must be a close match for a successful transplant.

##### Age

Are the remaining candidates too young or too old to receive this organ? If so, you must rule them out and they must continue to wait.

REMEMBER: A person is never too old or too young to donate or receive a transplant. Doctors will do their best to match the age of the recipient with the donor.

##### Geographic location

Look at the region map and determine which region the donor is in. Do all your remaining candidates live in the same or close region? If not, they must wait for a heart to become available in their region.

REMEMBER: A person can be listed in more than one region. Transplant candidates are often asked to live within a few miles of the hospital while on the waiting list.

##### Current state of health

Are all of the remaining candidates healthy enough to endure the transplant procedure? If they aren't, they must continue to wait.

REMEMBER: A person who has an active infection would be considered high risk for receiving a transplant and be temporarily removed from the waiting list. Once the infection has been successfully treated, the patient could again be listed for transplant.

##### Urgency of need of the remaining candidates, who will receive the heart?

<p><b>STEVEN</b></p> <p>AGE: 31 HEIGHT: 5' 11" WEIGHT: 175 LIVES IN: CO</p> <p><b>PERSONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>- Freshman at Galveston Central High School</li> <li>- Member of the tennis team and drama club</li> <li>- Has 19-year-old twin sisters</li> <li>- Parents both work at Wal-Mart</li> <li>- Has damaged heart valves from a strep infection when he was a kid.</li> <li>- Has been on the Transplant Waiting List for 3 months</li> </ul>	<p><b>DEBBIE</b></p> <p>AGE: 31 HEIGHT: 5' 11" WEIGHT: 150 LIVES IN: CO</p> <p><b>PERSONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>- Mother</li> <li>- Husband works in sales and travels 3-4 days per week</li> <li>- After graduation, plans on becoming a counselor for at-risk teens</li> <li>- Only child</li> <li>- His heart disease is advancing rapidly</li> <li>- Has been placed on the Transplant Waiting List for immediate heart transplant</li> </ul>
<p><b>DAVID</b></p> <p>AGE: 31 HEIGHT: 5' 11" WEIGHT: 150 LIVES IN: CO</p> <p><b>PERSONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>- Firefighter for 18 years</li> <li>- Volunteers in a homeless shelter</li> <li>- Likes bicycling and snowboarding with his girlfriend</li> <li>- He is currently being treated with antibiotics for a blood infection</li> <li>- Has been on the Transplant Waiting List for 6 months</li> </ul>	<p><b>PETER</b></p> <p>AGE: 22 HEIGHT: 5' 11" WEIGHT: 150 LIVES IN: CO</p> <p><b>PERSONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>- Senior at the University of Colorado, Boulder</li> <li>- After graduation, plans on becoming a counselor for at-risk teens</li> <li>- Only child</li> <li>- His heart disease is advancing rapidly</li> <li>- Has been placed on the Transplant Waiting List for immediate heart transplant</li> </ul>
<p><b>ISABELLA</b></p> <p>AGE: 6 months old HEIGHT: 20" WEIGHT: 5 lbs. 3 oz. LIVES IN: Colorado Springs, CO</p> <p><b>PERSONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>- Has 2 healthy siblings, ages 5 and 3</li> <li>- Father, Ed, is stationed at Fort Carson Army Base</li> <li>- Mother, Candy, works part-time in a dentist office</li> <li>- She was born with a heart defect which requires transplant</li> <li>- Has been on the Transplant Waiting List since birth</li> </ul>	<p><b>SUSAN</b></p> <p>AGE: 11 HEIGHT: 5' 11" WEIGHT: 150 LIVES IN: CO</p> <p><b>PERSONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>- She is healthy sibling, age 9</li> <li>- Parents have been happily married for 27 years</li> <li>- Currently a 7th grader at Arvada Central Junior High School</li> <li>- A bacterial infection caused her to be placed on the Transplant Waiting List for immediate heart transplant</li> </ul>