

Literacy Design Collaborative Student Exemplar

Course: Advanced Biology	Grade Level: 11/12
Type: Informational/Explanatory	Structure: Definition
Teaching Task 11B: After researching the provided resources on organ transplantation, write an essay that defines organ transplantation and explains reasons for requiring organ transplantation, and medical issues involved in identifying recipients and donors, addressing rejection, and regulating organ/tissue transplantation. Support the discussion with evidence from the research. L2 What implications can you draw?	
Performance Level: Advanced	

As most people know, organ transplantation is a life-saving medical technique and around twenty thousand transplantations occur every year. Though this may seem like a lot, there are not nearly enough donated organs to go around and meet demands. There are over one hundred and ten thousand people currently waiting for an organ and eighteen die each day. However, based on what organs can be donated, how and when, one donor can save up to eight lives (The Need). Organ transplantation is a safe, monitored process that can be very successful and has made a lot of progress over the years to become what it is today.

Medical transplantation is defined as a surgical procedure by which a tissue or organ is removed and replaced by a corresponding part, either from another part of the body or from another individual (Transplant Living). Organ transplantation focuses only on body parts from other individuals. It is sometimes necessary because an organ fails or is damaged through illness or injury. An organ will usually fail due to a serious chronic disease such as kidney failure, heart disease, lung disease or cirrhosis of the liver. Transplantation is most often a last resort, however, and is only used when other treatments have not been successful. Not only is organ transplantation used to save lives from these diseases or organ failures, but also it is also very important in experimental biology. It is used to study endocrine gland functions, to study interactions of cells in embryos, and to study malignant tissue in cancer research. Organ transplantation will make its own progress as well as provide important research in other medical areas of study. There are two types of organ donors from which organs can be recovered or harvested: live donors and cadaverous donors. Each type of organ that can be donated is specific to one type of donor. Kidneys, intestine, skin, bowel, lungs, and livers can all be donated from a live donor (Transplant Living). A living donor is most often a friend or family member and is not usually a stranger unless a friend or family member cannot provide an organ. Oppositely, the pancreas, cornea, and heart require a cadaverous donor. An acceptable cadaverous donor is most often brain dead but on artificial life support. In this case, the body and organs are still functioning, though technically, the person is dead. The only other types of organ transplantation are animal to human, human-to-human,

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and fetus-to-fetus. Fetus to fetus is used for fetal tissue implants and animal to human transplantation is still in the experimental stages (Harris).

The search for a match for each individual needing a transplant is very extensive to ensure that the right donor is found. Each donor has a list of patients matching the donor. Once an organ has been offered to a patient, a transplant surgeon can determine if it is suitable for that patient or can refuse it if the patient is too sick or cannot be reached in time. A computer program called the Organ Procurement and Transportation Network (OPTN) is used to find matches. The OPTN is a national database of all patients in the U.S. waiting for a transplant and is run by the U.S. Department of Human Services (The Need). There are many biological factors assessed by the computer program including blood type, tissue type, height, weight, degree of immune system match, and whether the donor or recipient is an adult or a child. Race, gender, income, and social status are not considered, however, length of time the patient has been waiting, severity of illness, and distances between donor and recipient hospitals are important factors.

Despite the cautious and thorough matching process, some organs are still rejected by the recipient's body. The recipient's immune system will recognize anything foreign in the body and will destroy it using cellular and molecular mechanisms. There are three types of rejection: 1) hyperacute rejection, which occurs as soon as the donated organ is in the body, 2) acute rejection, which occurs a few days post transplant, and 3) chronic rejection, which is gradual and can last months or years before it is noticed (Harris). The reason for rejection is that the transplanted tissue contains molecules called histocompatibility antigens (MHAs) that are unique to each person. The more antigens within the tissue, the quicker and more severe the rejection will be.

In order to reduce the risk of rejection, doctors attempt to find donors who have MHAs that match as closely as possible to the recipient. The standard way to reduce rejection in patients is a medication called an immunosuppressant, which controls the rejection by suppressing the immune system and therefore increasing the survival time of the transplant. This medication is completely necessary and also requires regular hospital visits, but eventually most patients develop a tolerance for their transplanted organ and can be taken off of the medication. This approach is not completely foolproof, though, so there are many new approaches to tackle rejection. Some focus on keeping molecular and cellular mechanisms from performing their function in destroying foreign organs and tissues. Another idea in experimentation is to "fool" the immune system by letting nerves grow naturally along the transplant, and then letting the immune system destroy the transplanted nerves. One additional method is called a bone marrow transplant. Bone marrow is acquired from the donor and is

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transplanted along with the organ. Bone marrow produces white blood cells that will merge with natural cells and help the body to accept the new organ (Harris).

The organization responsible for finding matches and saving so many lives is called the United Network for Organ Sharing (UNOS). It is described as a private, non-profit organization that manages the nation's organ transplant system under contract with the federal government. The mission statement on the UNOS website clearly states that they manage transplants to advance organ availability and transplantation by uniting and supporting communities for the benefit of patients through education, technology, and policy development (About Us). The most important aspect of UNOS is their community outreach and is the main focus of everything they do. They talk with the community, church groups, civic organizations as well as the general public by reaching out with events, exhibits, and presentations across the country. So what exactly does UNOS do in the process of organ transplantation? They manage the entire national transplant lists as well as maintain the database of all transplant data for the United States. UNOS also finds ways to give all patients a fair chance at a transplant, monitor every organ match to ensure policies are followed, assist patients and their families and educate the public.

Based on the research I have done on organ transplantation, I can say that a lot more needs to be accomplished. The chance of rejection is too high and not nearly enough people receive the transplants they need to save their lives. Based on the evidence I found about methods to reduce rejection, I am confident that a lot of progress will be made so that rejection is not even a factor in transplantation. The lack of organs available, however, will be a more difficult feat to overcome. Not enough people are willing to be live donors and I do not believe that will ever change. However, the prospect of synthetic organs for transplantation is an exciting one and will probably save many lives in the future. In the meantime, it seems to me that organ transplantation is as efficient as it can possibly be right now and organizations like UNOS do everything that they can to keep it that way.

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Works Cited

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Annotation		
Focus	4	The essay addresses all aspects of the prompt by clearly defining organ transplantation and explaining reasons for requiring a transplant as well as associated medical issues and regulations which oversee the process. The focus is maintained throughout the essay.
Reading/Research	4	The writer demonstrates sophisticated knowledge of the content and presents research that is pointed and specific. For example, the writer explains three types of rejection and how to combat rejection, which thoroughly supports the focus.
Controlling Idea	4	The thesis clearly addresses the task: <i>Organ transplantation is a safe, monitored process that can be very successful and has made a lot of progress over the years to become what it is today.</i> It supports the focus and is maintained throughout the paper.
Development	4	Research is fully elaborated upon and supports the focus. The writer provides direct quotes to explain the definition of organ transplantation, OPTN, and UNOS. There is strong and sophisticated detail regarding the types of organ donors and transplantation methods. The writer not only describes the concept of organ rejection, but also elaborates on the three different types of rejection. Implications for future development of organ transplantation are explored: <i>However, the prospect of synthetic organs for transplantation is an exciting one and will probably save many lives.</i>
Organization	4	The writer employs an effective organizational structure that is thoughtful and enhances the presentation of information. The thesis statement sets up an organizational structure for the essay by indicating that organ transplantation is a safe, monitored process, and this idea helps guide the reader through the logic in the paper.
Conventions	3.5	The writer demonstrates a strong command of the English language, with few errors. Sources are consistently and appropriately cited. Sophisticated vocabulary terms are used appropriately. The tone is consistent throughout the paper; however, the point of view shifts to first person in the final paragraph: <i>Based on the evidence I have found, I am confident...</i>
Content Understanding	4	The writer demonstrates a deep understanding of the process of organ transplantation and expands upon the research to extend to other areas of biology: <i>...not only is organ transplantation used to save lives from these diseases, but is also very important in experimental biology. It is used to study endocrine gland functions, to study interaction of cells and embryos, and to study malignant tissue in cancer research.</i>

This student would benefit from feedback, discussion, and/or instruction in the following areas:

- Maintaining a consistent point of view for formal research writing.