## General description:

The Sinai surgical residents will rotate in the Division of Transplantation at the Johns Hopkins Hospital at the end of their 3rd or during their 4th clinical year. The duration of this rotation is 6 weeks.

The Sinai resident will be a fully integrated member of the **Transplant Surgery team**, under the supervision of the Transplant Surgery attending staff, and will be working with experienced Transplant Surgery mid-level provider(s) and residents from other teaching institutions.

The surgical residents will participate in all care rendered to inpatient Transplant Surgery patients at the Johns Hopkins Hospital: admission, diagnostic work-up, operations, post-operative care and discharge. In addition, the surgical residents will participate in the care/operations of Transplant Surgery patients during Transplant Surgery Clinic and attending office hours.

The surgical residents will attend the following **educational activities**:

- Afternoon teaching rounds – two to three times weekly
- Transplant journal club – monthly
- General Surgery M&M – weekly; Transplant Surgery M&M - monthly
- General Surgery Grand Rounds - weekly
- General Surgery resident lecture series - weekly
- CTC Noon Research Lecture Series - weekly

## Competencies:

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<th><strong>Goals and Objectives:</strong></th>
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<td><strong>Goals:</strong></td>
<td>During this rotation, the resident should learn and practice to:</td>
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<td>• Demonstrate caring and <strong>respectful behaviors</strong> when interacting with patients and their families; demonstrate <strong>sensitivity</strong> to gender, age, ethnicity, religion, value systems and other potential differences of patients and their families; practice according to the clinical standards of the Johns Hopkins Hospital</td>
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<td>• Gather patient and case specific essential, <strong>comprehensive multi-source and accurate information</strong> about their patients for initial or peri-operative work-up and patient follow-up in the inpatient and outpatient setting</td>
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<td>• Using all available resources, under the guidance of the Transplant fellow and attending, make <strong>informed decisions about diagnostic and therapeutic interventions</strong></td>
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based on patient information, up-to-date scientific evidence and clinical judgment; evaluate and implement priorities in patient care and incorporate preventive measures

- Under the guidance of the Transplant fellow, attending and other designated Transplant Surgery related expert personnel, develop and **carry out patient management plans**

- Under the guidance of the Transplant fellow, attending and other designated Transplant Surgery related expert personnel, **monitor** closely the patient’s clinical progress, review and react to variances in patient progress or response to therapeutic interventions; **communicate** the details and changes of patient care, progress and complications to the Transplant fellow and/or attending in a timely manner

- Under close supervision of the Transplant fellow and attending and other designated Transplant Surgery related expert personnel, **counsel and educate patients** and their families on the state of the patient’s disease, necessary diagnostic tests, operative procedures and medical management

- Use information technology (hospital computer system) to support patient care decisions and patient education (electronic patient record, electronic radiology studies, online educational resources, including literature research)

- **Work closely with other healthcare professionals**, including those from other disciplines (Nephrology, Endocrinology, Hepatology/GI, mid-level providers, nurses, Transplant office staff, etc.), to provide patient-focused and optimum outcome driven care

- Ensure that the **needs of the patient and team supersede individual preferences** when managing patient care; incorporate evidence-based medicine into patient care whenever possible; comply with changes in clinical practice and standards given by Transplant fellow and/or attending

**Objectives:**

During the rotation, the resident should:

- Under one-on-one supervision of the Transplant attending, **perform competently and/or assist in procedures considered essential for the area of practice**, including:

  a. Vascular access, peritoneal dialysis access both, operative and percutaneous
  b. Kidney transplantation
  c. Pancreas transplantation
  d. Liver transplantation
  e. Removal of transplant organs
  f. Organ harvest (cadaver, living related)
  g. Transplant organ biopsy
  h. General surgery cases (elective or emergent) in transplant patients for conditions related or unrelated to organ transplantation
| Participate in the pre- and post-operative surgical management of patients before and after vascularized organ transplant; attend Transplant clinic at least once a week; participate on daily morning and afternoon patient rounds |
| Participate in the peri-operative management of immunosuppressive drug therapy in chronically medicated patients undergoing general and/or transplant surgery, including monitoring drug levels and treating potential toxicities |
| Plan and perform elective surgery in immunosuppressed patients with attention to minimizing infectious risks; perform emergent surgical intervention (treatment of perforated viscous, etc.) in similar high-risk patients |
| Recognize and treat infections (wound, systemic) and other complex disorders in chronically immunosuppressed patients undergoing elective and emergent surgery and post-transplant |
| Monitor drug levels and side effects in immunosuppressants |
| Participate in the care of patients receiving immunostimulatory medications (e.g., IV immunoglobulin [IVIG], granulocyte stimulating factor) |
| Evaluate potential candidates for living-related and cadaveric vascularized organ transplantation, including: |
| a. Clinical suitability |
| b. Strength of social support |
| c. Expected graft and patient survival |
| Participate in the evaluation of patients suspected of organ rejection to include: |
| a. Laboratory and radiologic testing |
| b. Administration of immunosuppressive agents |
| c. Following patients for potential acute and chronic side effects |
| Manage post-operative surgical complications, including wound infection, anastomotic stenosis and leaks, and lymphocele formation |
| Participate in the preparation and handling of multiple organ harvest in the brain-dead patient; Define suitability characteristics of organs for transplantation |

**Medical Knowledge:**

**Goals - Immunology:**

- Develop an understanding of general immunological principles and their application to surgical practice
- Develop an understanding of the principles of care for patients with abnormal immune function who are undergoing surgical procedures
- Develop an understanding of the principles and techniques of the field of molecular biology and the novel immune therapies having potential application to clinical surgery
Goals - Transplantation:

- Develop an understanding of the **history of clinical transplantation**, current **organization of transplantation in the United States** and the **guidelines for patient eligibility and priority listing**; understand the current method for the allocation of organs for transplantation, including consideration of the need, availability and philosophical biases surrounding organ donation; understand the united organ sharing (UNOS) method for assigning organs to potential recipients; understand how local procurement agencies function to optimize the donor organ pool and facilitate coordination of organ harvesting and their subsequent distribution.

- Develop an understanding of the **limitations of organ transplantation**, potential **future directions** and overall **cost to society**.

- Develop an understanding for the guidelines and care involved in **preparing patients and donors for organ transplantation**.

- Develop a working understanding of the fundamental immunologic principles governing organ transplantation and immunosuppression.

- Develop understanding of the potential metabolic, physiologic and other side effects of immunosuppressants, and potential clinical complications related to transplantation.

Objectives – Immunology:

At the end of the Transplant rotation, the resident should be able to:

- Describe the basic concepts of the **human immune system**, including cellular and humoral immunity; identify the cells involved in host defense, and their derivation from pluripotent stem cells; understand the specific functions of different cells (macrophages, lymphocytes, granulocytes – including major sub-populations) and their interactions.

- Describe **Macrophage** as antigen presenting cell; secretory products of macrophages.

- **T-cell** receptor(s) and interaction with the **human leukocyte antigen (HLA) complex**.

- Summarize the events in T-cell activation, including the roles of CD4+ and CD8+ cells and the release of involved interleukins.

- Explain the development, differentiation, and function of **B-lymphocytes** in the formation of **antibodies**; outline and describe the functional anatomy of an immunoglobulin molecule.

- Describe **tests of cellular immune integrity**, including skin and laboratory tests of lymphocyte function.

- Describe the **immune functions of the spleen, liver, thymus, and bone marrow**; summarize the impact of their manipulation on the immune system.

- Describe **immunological changes that occur in the elderly** patient compared to a
younger patient.

- Describe the **resident flora, mechanical barriers, local hormones, and chemicals of the epithelium** in the following tracts involved in the body's defenses against infection: skin, oropharynx, esophagus, stomach, small and large intestine

- Describe the body's response to infection when there has been no prior antigenic contact and when there has been prior contact; describe the effects of active and passive immunization

- Distinguish between several (most common) known **congenital and acquired immunodeficiency states**, including inborn syndromes of immunodeficiency, HIV/AIDS, sepsis and severe burns, diabetes, etc.

- Describe the mechanism of action and potential side effects of current **immunosuppressive agents**; state the rationale for their use and timing in transplantation and in other medical applications:
  
a. Prednisone and other corticosteroids  
b. Cyclosporine (CYA)  
c. Azathioprine  
d. Tacrolimus (FK506)  
e. Mycophenolate mofetil (RS6144)  
f. Monoclonal antibody (Moab)

- Recognize **new and investigational immunosuppressive drugs** used for transplant and non-transplant medical conditions; develop basic knowledge of the current rationale and clinical status of **novel treatments using biologic modifiers and immune modulation** and analyze their potential limitations and side effects; Develop a basic understanding of gene manipulation/transplantation and potential applications for such techniques; explain the significance of transgenic animals, their creation and potential application to experimental and clinical transplantation

- Differentiate between **agents used to treat acute transplant rejection**:
  
a. Prednisone and other corticosteroids  
b. Radiation therapy  
c. Poly- and mono-clonal antibodies

- Outline an approach to the identification (signs and symptoms), workup and management of **infection in immunocompromised patients** resulting from:
  
a. Iatrogenic immunosuppression secondary to drugs  
b. Natural immune deficiency states  
c. Impaired immunity secondary to cancer, diabetes or other medical conditions

- Formulate a plan for management of immunosuppression in patients with severe surgical morbidity or complications
Objectives - Transplantation Surgery:

At the end of the Transplant rotation, the resident should be able to:

- Understand the definitions, major causes (etiologies) and implications of **acute and chronic single and multiple organ failure** (kidney, pancreas, liver); understand the chronic (maintenance) and acute (exacerbation) medical management of such failure

- Describe the **anatomic and biologic terms associated with organ transplantation, donor and recipient relationships, and grafting between species**

- Explain the **human leukocyte antigen (HLA) complex**, including its genetic location and composition, pattern of inheritance, and the difference between Class I and II antigens of the major histocompatibility complex (MHC) and understand:
  
a. Serological determination HLA
  
b. Molecular methods of HLA
  
c. Cross-matching

- Discuss the role of **tissue typing** in the identification and preparation of patients for organ transplantation to include:
  
a. Natural, pre-formed antibodies
  
b. Acquired antibodies
  
c. The role of panel reactive antibody (PRA sensitization)
  
d. The effect of tissue typing compatibility on graft survival

- Discuss **advanced age as a positive consideration in solid organ transplantation** by considering the importance of:
  
a. Physiologic status vs. absolute age in years
  
b. Rate of organ rejection and its severity among the elderly
  
c. Elderly compliance with medical regimens
  
d. Extended life expectancy
    - Compare the 5-year survival for patients aged 60 and older receiving a renal transplant with those undergoing dialysis
    - Define the criteria for organ and tissue donation; apply these criteria to critically ill patients

- Explain the **clinical definition of brain death**, including a discussion of the available laboratory and radiologic studies to support the clinical criteria

- Analyze and formulate a plan for **management of the organ donor**

- Outline the development of **organ preserving** solutions and techniques, and describe the currently practiced methods for handling and storing vascularized organs

- Specify the various drug schemes for **induction, maintenance and rejection therapy**, including new "rescue" therapies
Describe the mechanism of action, dosing schedule and side effects of the following immunosuppressive drugs:

a. Azathioprine  
b. Prednisone  
c. Anti-lymphocyte globulin  
d. Cyclosporine  
e. Anti-T3 monoclonal antibody  
f. Tacrolimus (FK506)  
g. Anti IL-2R Moab  
h. Mycophenolate mofetil  
i. Rapamycin

Analyze the short- and long-term risks of chronic immunosuppression:

a. Opportunistic infections  
b. Lymphoproliferative disease  
c. Rejection  
d. Autoimmune diseases  
e. Cardiovascular problems

Evaluate the diagnostic maneuvers to detect hyperacute, acute and chronic organ rejection

Objectives - General:

- Complete the reading assignment (see literature list)
- Attend all (≥ 85%) conferences, M&M conferences, Grand Rounds/other educational activities of the Division of Transplantation Surgery during the rotation.
- Take a post-rotation self-assessment test with at least 75% correct answers

Practice-based Learning and Improvement:

Goals and Objectives:

Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- **Self-assessment**: Analyze practice experience during the rotation, as well as own performance-based on interaction with Transplant fellow, attending(s) and other key Transplant staff; accept and use constructive criticism to improve performance in the six core competencies.

- **Medical knowledge**: Self-directed and under mentorship of Transplant fellow and attending staff, locate, appraise and assimilate evidence from scientific studies related to their patients’ health problems; use evidence based medicine approach to patient care whenever possible; apply knowledge of study designs and statistical methods to
the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness; use information technology to manage information, access on-line medical information and support their own education; Facilitate the learning of students and other health care professionals on the Transplant service by sharing pre-existing and newly acquired knowledge (general and case-based) on rounds and during formal educational activities. Residents are encouraged to ask/question the Transplant fellow, attending staff and/or other Transplant Surgery related expert providers for clarification of unclear concepts/practices at any time.

- Participate in the **peri-operative management of transplant patients** as outlined in patient care competency; during the rotation, the resident should become familiar/proficient with:
  a. Immune system and its manipulation with resultant systemic consequences and management of complications
  b. Organ failures, individual and combined, definitions, etiologies and management
  c. Organization of transplantation in the United States, criteria for transplantation, exclusions and ethical considerations
  d. Management of complex multi-morbid patients

- Perform/participate in **Transplant service related operations** as outlined in the patient care competency; during the rotation the resident should become familiar/proficient with:
  a. Laparotomy
  b. Extra-peritoneal exposure (kidney transplant)
  c. Vascular dissection and anastomosis
  d. Ureteral dissection and anastomosis
  e. Biliary dissection and anastomosis

### Interpersonal and Communication Skills:

**Goals and Objectives:**
Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patient’s families and professional associates. Residents are expected to:

- Develop interpersonal skills necessary to **communicate effectively** with patients, patient families, nursing staff, mid-level healthcare providers, ancillary staff, medical students, fellow residents and attending staff in the complex multi-specialty environment that constitutes Transplantation Surgery
- Contribute to **creating an atmosphere of collegiality and mutual respect** with all providers involved in the care of patients
- Develop **effective listening, questioning and documentation skills**
Professionalism:

**Goals and Objectives:**
Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles and sensitivity to a diverse patient population. Residents are expected to:

- Demonstrate **adherence to institutional and departmental standards and policies**
- Demonstrate **respect, compassion, integrity and ethical behavior** that are consistent with the **values of the department, institution** and Johns Hopkins University School of Medicine; develop and sustain sensitivity toward differences of age, gender, culture, religion, ethnicity or other diversities in both co-workers and patients
- Demonstrate ability to appropriately take on, **share and delegate responsibilities** with regard to patient care; balance own rights and privileges appropriately with responsibilities and accountability resulting from being a member of a team dedicated to patient care
- Demonstrate **commitment to excellence and on-going professional development**
- Under attending and other Transplant staff guidance, develop skill to **resolve potential problems and conflicts that occur in a complex corporate environment** using the appropriate channels and methods of communication to maximize patient care and surgical service performance
- Evaluate and formulate a response to **ethical questions**, including:
  a. Should there be an age limit to organ transplantation? What should that limit be?
  b. Should there be transplantation for patients with cancer or with HIV/AIDS?
  c. Should medically non-compliant patients receive transplantation? What is medical non-compliance? Should patients with illicit drug or alcohol dependence receive transplantation? Under which circumstances?
  d. What are acceptable organs, for whom, under which circumstances?
  e. What are the medical support implications if transplantation fails?
  f. What are the ethical implications in living-(un)-related transplantation?

Systems-based Practice:

**Goals and Objectives:**
Residents must demonstrate an awareness of and responsiveness to the larger context and system of healthcare and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:

- Understand how choices in patient care and other professional practices affect other health care professionals, the healthcare organization and the larger society and how
these elements of the system affect their own practice:

a. Average cost of transplantation vs. conservative management of chronic renal failure, liver failure and diabetes mellitus per patient per year

b. The relevance and components of clinical pathways and how to deal with deviation

- Practice cost-effective healthcare and resource allocation that does not compromise quality of care

- Know how to partner with healthcare managers (Transplant coordinator, Social Work, Case Management, PT/OT and Rehabilitation medicine, etc.) and other healthcare providers (PMD, specialty providers in and out of the hospital) to assess, coordinate, and improve healthcare for the individual patient and cohorts of patients.