

Quantification of the intestinal load of a targeted set of resistance genes to Monitor Antibiotic Resistance in paediatric transplant patients - qMAR



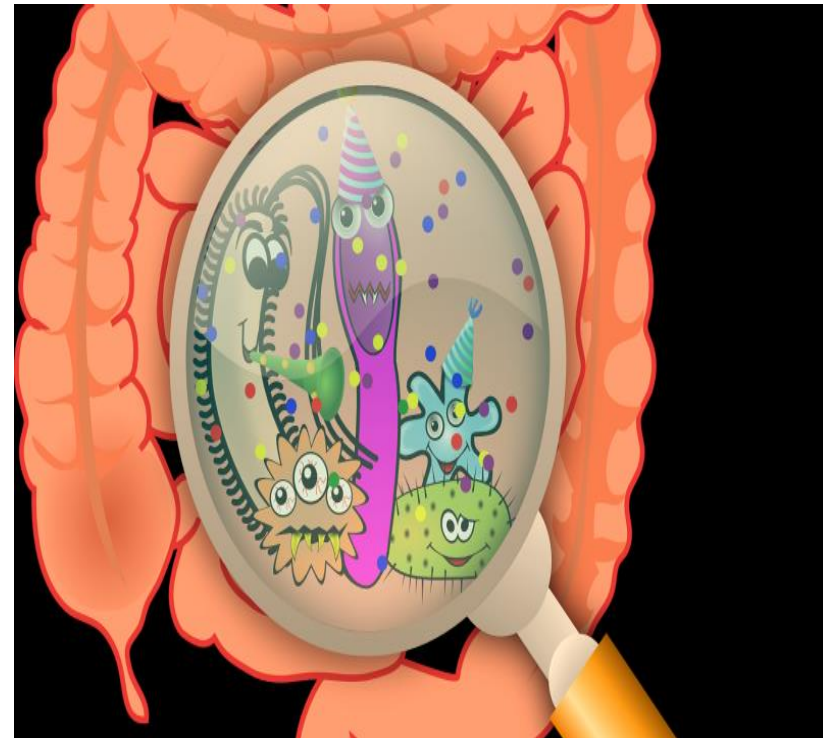
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The qMAR Project

Background

- **The gut microbiome aids in:**
 - ▣ Digestion and metabolism
 - ▣ Development and activation of the immune system
 - ▣ Production of neurotransmitters (affect behavior and cognitive function)
 - ▣ Protection against pathogenic organisms
- **Disruption of the microbiome:**
 - ▣ Affects development
 - ▣ Raises chances of pathogenic infections



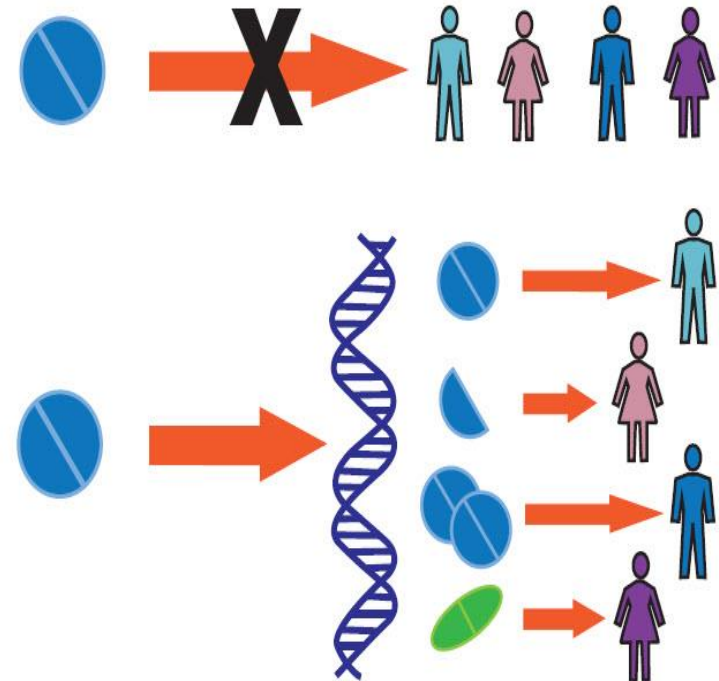
Background

- **Infant transplant patients:**
 - ▣ Are in a state of immunosuppression
 - ▣ Take extensive amounts of antibiotics
- **Antibiotic usage:**
 - ▣ Disrupts the microbiome
 - ▣ Drives resistance
- **Bacterial resistance:**
 - ▣ Public health concern (frequent re-admission)
 - ▣ Risk of outbreaks with MDROs
 - ▣ Load of resistance predictive of pathogenic infections



Background

- **Personalized medicine:**
 - Relies on biomarkers
 - Limits trial and error
 - Leads to better clinical outcomes
- **Biomarkers:**
 - Genetic fragments are most sensitive
 - qPCR is a highly sensitive tool to detect genetic fragments



Aim and Objectives

- **Aim:** determining biomarkers that could be used in personalized medicine approaches in order to improve on the clinical outcome of paediatric transplant patients

- **Objectives:**
 - ▣ To collect samples from paediatric transplant patients using non-invasive procedures
 - ▣ To track and quantify the antibiotic resistance genes over time using qPCR
 - ▣ To determine associations between clinical interventions, the resistome, and clinical outcome

Methodology



Obtaining rectal swabs from infant transplant patients

Each patient will be tracked for 1 year

Detecting resistant isolates

Samples will be grown on selective media

Determining the relative load of resistance genes by qPCR

Focus on *bla*_{CTX-M}, *bla*_{OXA-1}, *bla*_{OXA-48}, *bla*_{VIM}, *aacA3*, and *aadA6* gene families

Collecting and monitoring patient data

Determining statistical associations between clinical interventions, bacterial resistance, and clinical outcome

Expected Output

- “The Use of qPCR as a Tool for Monitoring the Resistome among Paediatric Transplant Patients”
- “The Effect of “X” on the Resistome among Paediatric Transplant Patients (where X represents a specific medical intervention)”
- “The “X” Load of “Y” in the Gut Microbiome of Paediatric Transplant Patients increases the Chances of “Z” (where X is the load quantified by qPCR, Y is a specific gene(s), and Z is a specific adverse effect)”



Preparing the Proposal

Process

Idea

- Innovative
- Relevant
- Unique

Team

- Strong track record
- Knowledgeable
- Helpful

Read

- Proper literature review
- Every detail of the guidelines for the proposal

Process

Write

- Write outline and backbone
- Write requirements for each section
- Build sections on the backbone

Proof-read

- Eliminate all mistakes
- Send to team for proofreading
- Keep track of changes

Final touches

- Expert opinion
- Visually attractive
- Stick to guidelines



Process

EU portal

- Complete the entire application
- Be accurate
- Follow all instructions carefully

Deadlines

- Make sure not to miss deadlines
- Coordinate with team ahead of time

Check Email

- Regularly check for notifications from the EU portal
- Follow instructions and deadlines as they are sent

Tips



- Guidelines are not suggestions, make sure to stick to them
- Become an expert in what you are writing about
- Have a solid literature review and methodology
- Always highlight the innovative nature of the project
- Highlight the benefits of this project to everyone
- Have a detailed action plan and proper division of work packages
- Convince the reviewers that you, the team, and the institution are able to complete this project
- Convince the reviewers that you will properly disseminate the results and will be able to publish well
- Start preparations several months before submitting
- Follow the advise of knowledgeable people
- Be patient! The process takes time



Thank you!