

# Study to evaluate the immune responses against *Salmonella* Typhi after vaccination with Vivotif®

<b>Submission date</b> 27/05/2015	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 13/08/2015	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 05/09/2023	<b>Condition category</b> Infections and Infestations	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

*Salmonella* species are the most common bacterial cause of gastrointestinal infection worldwide and represent a considerable burden in both developing and developed countries. Although *Salmonella* is an intracellular pathogen (that is, a bacterium that lives inside the body cells), a number of studies have shown that B cells play a crucial role in the control and generation of immunity against this bacterium. Likewise, the main mechanism of protection after vaccination in humans is mediated by antibodies. Outer membrane proteins (Omps), also known as porins, represent important targets of the protective antibody response against *Salmonella* in humans. Highly purified *S. Typhi* porins OmpC and F induce long-lasting IgM and IgG bactericidal antibody responses in mice and exhibit intrinsic adjuvant activity. Notably, patients recovering from typhoid fever present both IgG and IgM circulating antibodies against porins and a porin-based vaccine candidate based on *S. Typhi* porins has been tested in humans resulting to be safe and immunogenic following subcutaneous application. The induction of porin-specific immune responses after vaccination with live attenuated *Salmonella* vaccine Vivotif® has not been tested. Moreover, the specific antigenic targets that mediate protection during vaccination have not been identified. In this study, healthy volunteers will be vaccinated with Vivotif® commercial *Salmonella* vaccine and immune responses against *S. Typhi* porins assessed.

### Who can participate?

Healthy adults aged between 18-50 years.

### What does the study involve?

Participants are randomly allocated into one of two groups. Those in group 1 are given the Vivotif® vaccine, to be taken orally, on alternative days (1, 3 and 5). Those in group 2 are not vaccinated. Blood and stool samples are collected before treatment begins and then at days 7, 21 and 56 after treatment ends. Immune responses against *S. Typhi* porins are then assessed.

### What are the possible benefits and risks of participating?

Vaccination with Vivotif can protect against typhoid fever. The time of protection lasts approximately 5 years and therefore participants may benefit from vaccination if they attend all

study visits. However, not all recipients of Vivotif will be fully protected against typhoid fever and travellers should take all necessary precautions to avoid contact or ingestion of potentially contaminated food or water. Importantly, since this is a randomised study, participants may be assigned to the control group that will not receive the vaccine. Vivotif is a safe vaccine, but for safety reasons participants should consider not taking some drugs during vaccination (indicated by the investigator) and follow the instructions of medical personnel. Adverse reactions are infrequent and mild, but some people may experience: diarrhea, abdominal pain, nausea, fever, headache, skin rash, vomiting, or urticaria (hives) in the trunk (body) and/or extremities (for example, fingers, toes).

Where is the study run from?

Kantonsspital St.Gallen Hospital (Switzerland)

When is the study starting and how long is it expected to run for?

October 2014 to October 2015

Who is funding the study?

Kantonsspital St.Gallen Hospital (Switzerland)

Who is the main contact?

1. Prof. Burkhard Ludewig (scientific)

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2. Dr Werner Albrich (public)

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## Contact information

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## **Additional identifiers**

**Protocol serial number**  
14/039

## **Study information**

### **Scientific Title**

Open, controlled monocentric clinical study to evaluate the specific immune responses against Salmonella Typhi porins after vaccination with the commercial live oral typhoid vaccine Ty21a Vivotif®

### **Acronym**

PORIMTIF

### **Study objectives**

Specific immune responses against porins are generated after the administration of Vivotif® to healthy volunteers.

H1: The median difference of specific immune responses after and before immunization is not zero.

H0: The median difference of specific immune responses after and before immunization is zero.

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

the Ethikkommission des Kantons St. Gallen, 06/07/2015, ref: EKSG 15/085

### **Study design**

Open interventional study

### **Primary study design**

Interventional

### **Study type(s)**

Prevention

### **Health condition(s) or problem(s) studied**

Typhoid fever caused by Salmonella Typhi

### **Interventions**

1. Vaccinated group (n=15): Vivotif® (Typhoid Vaccine Live Oral Ty21a) is a live attenuated vaccine for oral administration only. The vaccine contains the attenuated strain Salmonella Typhi Ty21a. Three doses of the vaccine are to be administered in alternate days (1, 3 and 5)
2. Untreated group (n=5): No vaccine/treatment/placebo will be administered to this group

**Intervention Type**

Biological/Vaccine

**Phase**

Not Applicable

**Drug/device/biological/vaccine name(s)**

Not provided at time of registration

**Primary outcome(s)**

1. Antibody levels of IgM and IgG specific against porins in serum (during visits 2, 5, 6 and 7) and IgA in stool (during visits 2, 5, 6 and 7) via enzyme-linked immunosorbent assay (ELISA)
2. Number of porins-specific T cells from blood (during visits 2, 5, 6 and 7) via flow cytometry
3. Amount of porins-specific B cells in blood (during visits 2, 5, 6 and 7) via ELISPot

**Key secondary outcome(s)**

Bacteria bearing mutations in their DNA sequences in comparison with bacteria from the original inoculum administered during vaccination

**Completion date**

01/10/2015

**Eligibility****Key inclusion criteria**

1. Ability to understand the experimental nature of the vaccine evaluation and the participant informed consent form
2. Written informed consent documented by date and signature to be obtained prior to any study specific procedure
3. Age 18-50 years old
4. Regular bowel movement (1+ defecation per day)
5. Willingness to adhere to the strict timing schedule for the study evaluation
6. Willingness to provide stool and blood samples in the indicated visits

**Participant type(s)**

Healthy volunteer

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Upper age limit**

50 years

**Sex**

All

**Key exclusion criteria**

1. Previous use of an oral vaccine against Salmonella in the past three years
2. Gastrointestinal infection caused by any Salmonella species during the past 3 years
3. Positive HIV serology or any known immune deficiency
4. Current or planned pregnancy during the course of the study
5. Unwillingness to use at least one method of birth control in women of childbearing age during the course of the study
6. Are breastfeeding
7. Suffer from obstipation
8. Suffer from hypersensitivity to any component of the vaccine or the enteric-coated capsule
9. Use of an immune modulator in the past year
10. Use of systemic corticosteroid treatment in the past 30 days
11. Use of antibiotics within 1 week preceding and during the present study
12. Current use of proton-pump inhibitors
13. Participation in another study with investigational drug within the 30 days preceding and during the present study

**Date of first enrolment**

15/06/2015

**Date of final enrolment**

15/09/2015

**Locations****Countries of recruitment**

Switzerland

**Study participating centre**

Kantonsspital St Gallen

Rorschacherstrasse 95

St Gallen

Switzerland

9007

**Sponsor information****Organisation**

Kantonsspital St.Gallen Hospital

ROR

<https://ror.org/00gpmb873>

## Funder(s)

### Funder type

Hospital/treatment centre

### Funder Name

Kantonsspital St Gallen (Switzerland)

### Funder Name

Gottfried und Julia Bangerter-Rhyner-Stiftung

### Alternative Name(s)

Gottfried & Julia Bangerter-Rhyner-Stiftung, Bangerter-Stiftung, Gottfried and Julia Bangerter-Rhyner Foundation

### Funding Body Type

Private sector organisation

### Funding Body Subtype

Trusts, charities, foundations (both public and private)

### Location

Switzerland

## Results and Publications

### Individual participant data (IPD) sharing plan

### IPD sharing plan summary

Available on request

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	results	01/06/2017		Yes	No
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes

