

# **“BUSTING THE STOMACH BUGS”**

**By Dorota Rzetelska**

**Access to Biological Sciences  
Science and Technology in Society, Outcome 3  
Communication: Intermediate Two, Outcome 2  
For the attention of John O’Neill and Mark  
Hetherington.**

**DATE OF SUBMISSION 25/05/2009**

**WORD COUNT 1496**

Contents Page number

1. Introduction.....2

2. Research methods/plan.....2

3.1 An overview of Marshall and Warren.....2

3.2 An investigation of Marshall and Warren’s work.....3

3.3 The impact of Marshall and Warren’s work on society.....4

4. Conclusion.....5

5. Evaluation.....5

6. References.....5

## **1. Introduction.**

The report was prepared as an assessment for the Science and Technology in Society unit lectured by John O'Neill and Communication unit lectured by Mark Hetherington.

Submission date was 25/05/2009.

The report investigates Marshall and Warren's achievements in re-discovering *Helicobacter pylori* and its influence on developing of peptic ulcers diseases. The report evaluates the impact of Marshall and Warren's researches on society and medical community.

## **2. Research methods/plan.**

All information included in this report was obtained from articles accessible on various websites listed in References.

By 30/09/2008 the topic of report and scientific heroes had been chosen.

By 28/10/2008 the brief outline plan had been prepared.

By 25/11/2008 the 200 words of summary was presented.

By 13/01/2009 the research of information was completed.

By 16/03/2009 the power point presentation had been delivered.

By 25/05/2009 the report had been submitted.

### **3.1 An overview of Marshall and Warren.**

Robin Warren (born 1937), a pathologist from Perth, Australia is a researcher who became interested in *Helicobacter pylori* in late seventies. He is credited with the re-discovery of these bacteria in 1979. He also helped to develop the breath – test for detecting the presence of *Helicobacter pylori* in a body system.

Dr. Warren received his MBBS degree from the University of Adelaide. The majority of his career he spent at the Royal Perth Hospital as a senior pathologist.

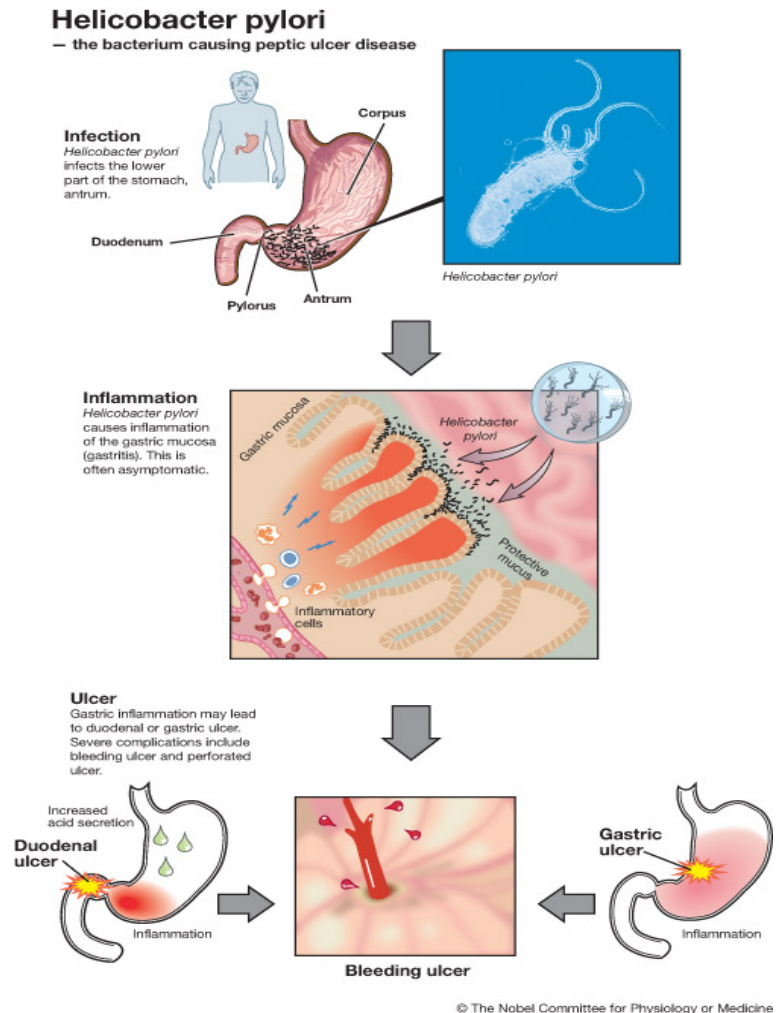
Barry Marshall (born 1951), a gastroenterology researchers, is the Professor of Clinical Microbiology at the University of Western Australia. His name is well-known for proving that *Helicobacter pylori* are the main cause of stomach ulcers. He received a Bachelor of Medicine and Surgery in 1975 at the University of Western Australia.

The two scientists began working together in 1981 at the University of Western Australia. They discovered that inflammation in the stomach and peptic ulcer disease is caused by bacterial infection. Warren and Marshall were awarded the Nobel Prize in Physiology or Medicine 2005 in recognition of their discovery that *Helicobacter pylori* bacteria are the causative agent of peptic ulcers.

### 3.2 An investigation of Marshall and Warren's work.

*Helicobacter pylori* is a spiral-shaped bacterium present in various areas of the stomach and duodenum in about 50% human population, making it the most widespread bacterial infection in the world. *Helicobacter pylori* cause a chronic inflammation of the stomach lining and are strongly linked to the development of peptic ulcers disease and stomach cancer. Bacteria are transmitted probably in early childhood by swallowing it in food or liquid. Transmission is the most likely to occur within families. The infection tends to be more common where the level of hygiene is poor.

Bacteria remain in the stomach usually for the rest of the person's life. In 80% of cases infection is asymptomatic but in every individual the gastric inflammation develops. In 10 – 15% of infected the gastritis lead to peptic ulcer disease. Carrying the *Helicobacter* constantly for 20-30 years can contribute to stomach cancer (1-2% cases).



*Helicobacter pylori* developed specific methods of colonizing the stomach. To survive strong acidic pH, bacteria burrow into the mucus and settle close to the stomach's epithelial cell layer where pH is more neutral. The mucus layer protects the stomach cells from acid and so *helicobacter pylori*. *Helicobacter pylori*'s power to survive in the acidic stomach depends also on producing the enzyme urease. Urease breaks down urea to carbon dioxide and ammonia, which neutralizes gastric acid.

In the late 1970s J.R Warren noted the presence of spiral-shaped bacteria in the lower part of the stomach in about 50% of tissue samples taken from patients suffering from ulcers. He observed that inflammation was always present in the mucus close to bacterial colonies. Robin Warren did further research on it with Barry Marshall. After many unsuccessful attempts at culturing those bacteria, they finally cultured *Helicobacter* during long Easter weekend in 1982 by accident. Petri dishes

with samples of bacteria were left incubated unintentionally for 5 days over the Ester holidays. Cultured bacteria became the object of scientific study.

By analyzing 135 tissue samples collected during three years of research Marshall and Warren concluded a strong association between the appearance of *Helicobacter pylori* and inflammation of the stomach (gastritis). They found that bacteria were present in almost all patients suffering gastric inflammation and peptic ulcers disease. Based on results, they proposed that duodenal and stomach ulcers develop as the consequences of inflammation.

At this stage, the common thinking was that ulcers were caused by excess acid in the stomach, due to stress and lifestyle. Smokers, people from economically disadvantaged background and people who led a stressful lifestyle were more likely to suffer from peptic ulcers.

Nobody believed that bacterial infection can be the etiology of these diseases. The long- standing belief in medical teaching and practice in early eighties was that no bacterium can survive in the presence of very strong stomach acid.

Barry Marshall was so determined to convince the scientific and medical community that spiral – shaped bacteria are the main cause of ulcers that in 1985 he carried out a controversial experiment. First he underwent gastric biopsy to give evidence that he was not the *Helicobacter pylori* carrier and next he consumed a beaker of liquid containing *Helicobacter pylori*. After five days he became ill with nausea and vomiting. An endoscopy few days after revealed the stomach inflammation and the presence of bacteria. The symptoms had been cured by the use of antibiotics. The results proved that a healthy person can be infected by these bacteria and that *Helicobacter pylori* are the factor causing gastritis.

Further research into new ways of treatment showed that peptic ulcers diseases can be effectively cured only when the bacteria were eradicated from the stomach. During that time the primary method of peptic ulcers treatment was controlling the secreted gastric acid.

### **3.3 The impact of Marshall and Warren's work on society.**

Marshall and Warren's discovery had enormous impact on lives of patients suffering from peptic ulcers disease. Their research caused a revolution in understanding, diagnosing and treatment of pathogenic implications of carrying *Helicobacter Pylori*. The peptic ulcers disease had been transformed from a chronic, frequently disabling condition to one that can be cured in a fast and effective way - by antibiotics.

Also Marshall and Warren's discovery that ulcers were caused by *Helicobacter pylori* not by stress and life style, turned medical dogma on its head. The medical knowledge underwent a radical modification and progress.

The discovery that the cause of the most common disease in human, peptic ulcer disease is a bacterial infection stimulated the research of bacterial etiology of other chronic inflammatory conditions. It contributed to better understanding of the link between chronic infection, inflammation and cancer.

Thanks to Marshall and Warren's research, the *Helicobacter pylori* infection became one of the best – studied cases of pathogen biology.

To introduce the common people with the latest information about bacterium, methods of its diagnosis, treatments and clinical prospective, Barry Marshall founded the "Helicobacter Foundation" in 1994.

In recognition of remarkable achievements Robin Warren was nominated a Companion of the Order of Australia in 2007 and Dr. Marshall received e.g. the Australian Medical Association Award in 1995, the Australian Centenary Medal in 2003 and he was nominated a Companion of the Order of Australia in 2007.

#### **4. Conclusion.**

From information provided it can be concluded that Marshall and Warren's achievements were remarkable and reversed the medical knowledge in the early eighties. The hard work of these two Australian scientists improved the quality of life millions of people by providing proper information and correct treatment. It also influenced other researchers to consider very controversial claim that chronic disease can have a bacterial infection background.

The extraordinary experiment carried out by Barry Marshall demonstrated commitment and dedication to his research and has very important impact on the last 50 year's perception of gastric pathology.

#### **5. Evaluation.**

The process of writing the report was challenging for a few reasons. The language used was not the mother-tongue for the author. Some information available from various sources was appropriated for recipients with high level of medical knowledge and terminology. The big number of available articles entailed necessity of selection the most reliable sources.

Comparing the information coming from different sources the observation was made that some information were inaccurate or out-of-date.

Investigating Marshall and Warren achievements was very interesting and resulted in gaining new skills. Researching of information, delivering power point presentations and writing a report became more familiar.

#### **6. Sign and Date.**

25/05/2009

Dorota Rzetelska

## **7. References:**

[www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1283743](http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1283743)

[www.health24.com/medical/condition\\_centres/777-792-813-1749'17408.asp](http://www.health24.com/medical/condition_centres/777-792-813-1749'17408.asp)

[www.en.wikipedia.org/wiki/Helicobacter\\_pylori](http://www.en.wikipedia.org/wiki/Helicobacter_pylori)

[www.gicare.com/Diseases/Helicobacter-Pylori.asp](http://www.gicare.com/Diseases/Helicobacter-Pylori.asp)

[www.nobelprize.org/.../laureates/2005/press.html](http://www.nobelprize.org/.../laureates/2005/press.html)

[www.helico.com/h.history.html](http://www.helico.com/h.history.html)

[www.rah.sa.gov.au](http://www.rah.sa.gov.au)

[www.dooktor.pl/artykuly-medyczne/zdrowie/zakazenie\\_helicobacter\\_pylori.html](http://www.dooktor.pl/artykuly-medyczne/zdrowie/zakazenie_helicobacter_pylori.html)