

# New born chicks can serve as an experimental animal model for Human Campylobacteriosis

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**Abstract.** – *Campylobacter* enteritis is an emerging food borne zoonotic disease. Improperly cooked chicken serve as a potential source for this infection. Diarrheogenic potential of *Campylobacter jejuni* is tested either by in-vivo rat ileal loop (RIL) test or by molecular methods. This study reveals that 3-day-old chicks can serve as an animal model for toxigenic *C. jejuni*.

*Key Words:*

Chicks, Animal model, *Campylobacter jejuni*.

## Introduction

Human Campylobacteriosis is an established zoonotic disease<sup>1</sup> and chicken have been found to be the commonest reservoir of *Campylobacter jejuni*<sup>2</sup>. Diarrhoeogenic strains of *C. jejuni* produce a heat-labile enterotoxin (LT) which is similar in many aspects to the LT of *Vibrio cholerae* O1 and *Escherichia coli*<sup>3</sup>. RIL has been considered as an in-vivo model for testing enterotoxigenicity of *C. jejuni*<sup>4</sup>. This study aims at the possibility of new born chicks to serve as experimental animal model for human Campylobacteriosis.

## Materials and Methods

One-day-old chicks were collected from local private farms. The faecal samples of chicks were cultured for presence of *Campylobacter* species. The *Campylobacter* negative chicks were divided into two groups and kept in two different rooms in

the animal house. One group served as control and the other as test. Each group consisted of 15 chicks. The *C. jejuni* strains isolated from human samples and were positive in RIL tests, were dissolved in Phosphate Buffer Saline (PBS) to create a suspension live organisms of  $10^3$ /ml,  $10^4$ /ml and  $10^5$ /ml concentrations. One ml of each suspension was fed orally to five 3-day-old chicks. The control group received only 1 ml PBS orally. The stool samples were collected after 48 hours and cultured on suitable media for isolation of *C. jejuni*. Two chicks from each group receiving different inoculum were sacrificed. The small and large intestine were examined for histopathological (H/P) changes after Haematoxylin and Eosin staining.

## Results

Cent percent infection could be achieved in the chicks at  $10^4$ /ml and  $10^5$  /ml concentration of live *C. jejuni* strains. At  $10^3$ /ml concentration, 3 (60%) out of 5 chicks tested, infection could be established. In control experiments, none of the 15 chicks tested showed presence of *C. jejuni* in their stool. In H/P sections congestion of mucosal cells and oedema of ileal mucosa were seen in most of the sections of animals under test group. Hyperplasia and atrophy of villi were also seen in some part of distal jejunum. In mild cases, submucosal oedema was seen. No noticeable change could be seen in the H/P sections of the control animal group. All chicks under the test group developed diarrhoea within 48 hours of oral inoculation of live *C. jejuni*.

## Discussion

Human *Campylobacter* enteritis is an important zoonotic diarrhoeal disease and chicken are the principal source of infection. Diarrheogenic potentials of *C. jejuni* lie in the production of LT which is tested by in-vivo test like RIL which is very cumbersome and need to sacrifice animals which is also very costly.

New born chicks are free from intestinal colonisation by *Campylobacter* species till their 10 days of age<sup>5</sup>. In this study 3-day-old chicks were used as experimental animals and 100% infection could be established at 10 to the power 4/ml concentration of live bacteria when fed orally. The infected chicks developed diarrhoea and showed significant H/P changes which corroborates with the findings of Welkos<sup>6</sup> and Ruiz-Palacios et al<sup>7</sup> respectively.

With the discovery of new molecular techniques, the diagnosis of pathogens is done by detection of presence of the particular gene by molecular methods which is beyond the scope of many laboratories. The possibility of RIL tests for detection of diarrheogenic *Campylobacters* is also far from reality considering the cost and difficult procedure of the tests. Again, mere isolation of *Campylobacter jejuni* from diarrhoeal cases does not always mean their causative role since asymptomatic carriage is common in

human beings. Rearing of chicks in laboratory is very simple and cheap. Chicks developing diarrhoea following oral inoculation of live *C. jejuni* can be utilized as an alternative experimental model for diarrheogenic *Campylobacters*.

## References

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