

# Phenotypes of Male and Female Infertility as Result Aberrant DNA Methylation in *Helicobacter Pylori* Infected

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*Helicobacter pylori* infects a human in early childhood when the pathogen is transmitted from mother (preferably with water). Over 80% of *Helicobacter pylori* infections have been no any symptoms, and may persist in the human stomach longlife.

Increased risk of expression phenotypes of male and female fertility in *H. pylori* infected was confirmed a number of authors [1-7].

Infertility in men is associated with infected decrease in the number of sperm in the ejaculate, in their activity and mobility was reduced. When the female infertility was observed preeclampsia with fatal consequences for mother and fetus, polykystoz ovary syndrome, spontaneous abortion. This mechanism of male and female fertility was associated with antigenic mimicry protein  $\beta$ -tubulin of sperm tail, of *Helicobacter pylori* protein flageline of flagella and the main factors of pathogenicity of microorganisms - protein CagA and VacA, and infertility seen as an autoimmune disease [1].

DNA methylation in normal ensures regulatory function of genes, genomic imprinting, inactivation of the X chromosome, DNA replication, cell differentiation, maturation of gametes at spermatogenesis and oogenesis.

Aberrations in DNA methylation that occur in the islands SpG, associated with the addition of methyl groups CH<sub>3</sub> in position 5 to cytosine, which prevents the next binding the DNA transcription factor, thus can block transcription of genes, that leads to an inactivation of methylated genes (8). Thus, due to aberrant

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methylation in the islands SpG promoters of genes that encode gametogenesis can occur the deregulation of jobs and the inactivation of separate genes. Such epimutations do not change the DNA sequence of nucleotides, but can lead to phenotypically change that can have transgenerational inheritance. The assumptions of triggers role of Helicobacter pylori in aberrant methylation of sex chromosomes X and Y is plausible.

One of the sensitive periods are prepubertal maturation of gametes men - aged 9-12 years and women - in 8-10 years. It is also possible, retroviruses part of the human genome that have been found to help in embryos implantation [9]. D.J. Denner (2016) on this occasion said: "If there was a virus, we would not be born." Found that in male infertility critical role played significant number of promoters hypermethylation of individual genes.

A key role in the development of male gametogenesis and belongs to the main male gene - SRY gene that initiates transcription of other transcription factors. A gene called SRY gene is X degrading the male - specific region of Y chromosome that expresses mainly testis [10]. SRY protein, produced by this gene, is a transcription factor and must join to specific regions of DNA for the transcription.

As is known SRY gene located on the short arm of chromosome Y in p.11.3 locus is responsible for sperm production. USP9Y gene, localized in AZF region, in the locus Yq 11.2 of long arm of Y chromosome, and controls spermatogenesis. The deletions Y chromosome lead to oligospermia, azoospermia and male infertility. Recent years reliably established that the inversion loci p11q12, localized on pericentric area of chromosome 9, often the cause of male infertility[11]. The effect of epimutations with breaking of specific genes and their inactivation due to aberrant methylation of promoters in the islands SpG may also have similar effects to mutations in the form of infertility.

In the analysis of cytogenetic maps X and Y chromosomes we found a number of genes homologous of loci placement, including the SRY gene - p.11.3 locus on the short arm of chromosome Y and X homologous locus p11.3 - on the short arm of the X chromosome; for USP9Y gene, located in locus Yq 11.2 long arm Y chromosome are homologous loci X I Y chromosome: Xq11.2 - on the long arm of the Y chromosome locus and Xp11.21, Xp11.22 i Xp11.23 - on the short arm of the X chromosome.

Obviously, epimutations that unlike mutations have monoallelic nature and associated with the aberrant methylation of cytosine, differ on the mechanism of expression: when genetic disease in women express in the homozygotes state X chromosomes and men - in hemizygotes state, epimutations can express in heterozygotes state in women and in homozygotes state homologous epimutations X and Y chromosomes - in men.

We can assume that in man homozygotes homologous loci aberrantly methylated epialleles X and Y chromosome (paternal and maternal origin) occurs in F0 and F2 generations and in women aberrantly

methyated loci X chromosome may be expressed in generations F1 and F2 in the heterozygous state. In the event that aberrant methylation during gametogenesis in women is associated with epialleles X chromosome, while in man - chromosome Y, the expression of phenotypes of infertility can be observed in women already in F0 and then in F1 generations, and men - in generations F1 and F2 respectively.

Thus, expression phenotypes of diseases associated with aberrant DNA methylation may occur in different generations of transgenerational inheritance of man and women.

**Conclusion.** We hypothesize epigenetic mechanism of male and female fertility by Helicobacter pylori infection that associated with aberrant DNA methylation in prepubertal gametogenesis. Homologous loci of genes Y chromosome was revealed in X chromosomes: for SRY gene (chromosomal localization is Yp11.3 in Y chromosome) and for gene USP9Y(chromosomal localization is Yq11.2 in Y chromosome) homologous loci are present in X chromosome. Expression infertility can occur in men through homozygotisation homologous loci of aberrant methylated epialleles X and Y chromosome (of paternal and maternal origin), and for women – aberrantly methylated loci X chromosome.

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