
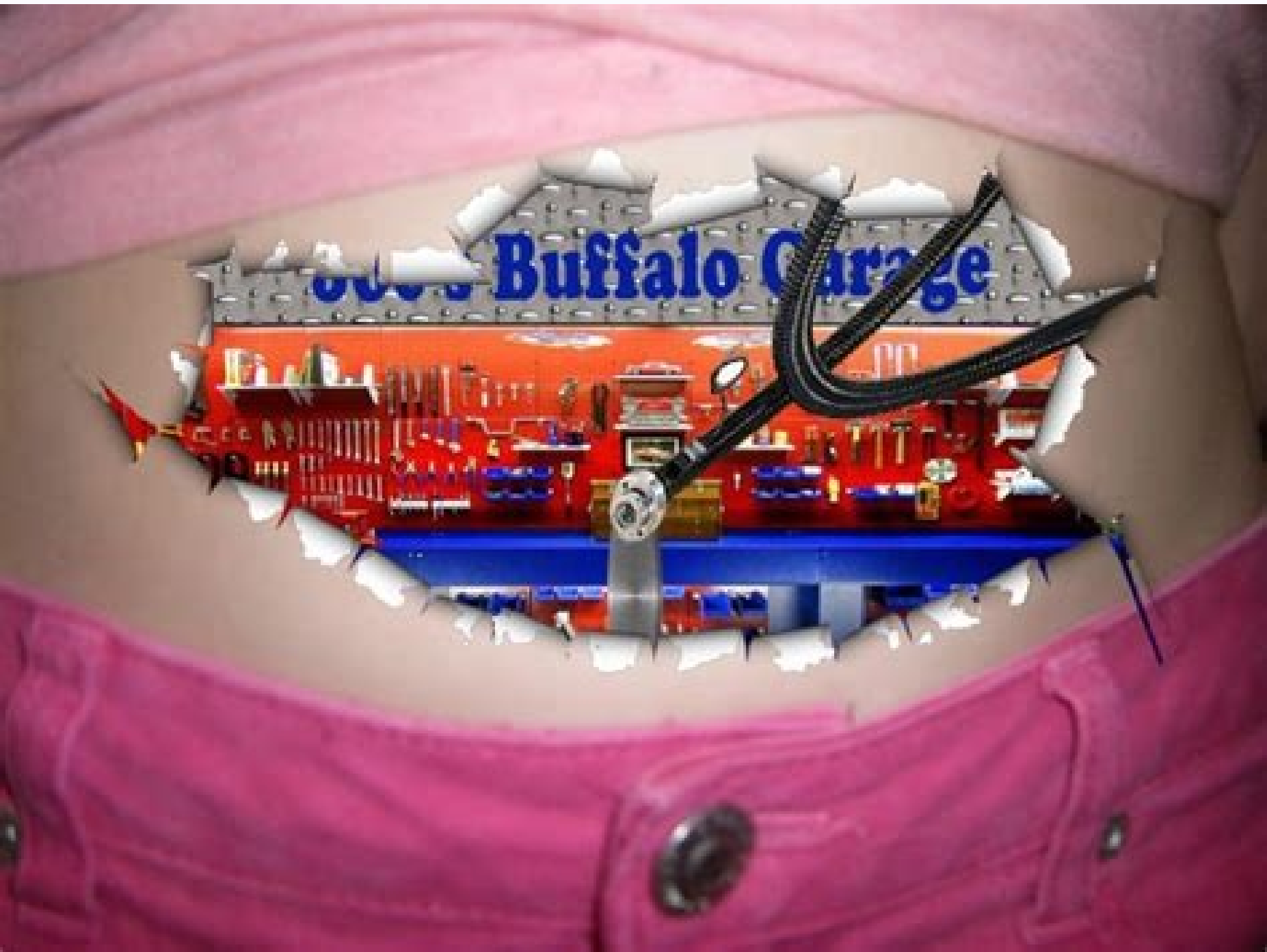


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can include humans. 327(26): p. Evolution tells us that both species evolve, the other species interacts with must also evolve or they may go extinct. Many studies have shown that consuming folic acid increases blood folate concentrations. Crider, K.S., et al., MTHFR 677C->T genotype is associated with folic acid and homocysteine concentrations in a large, population-based, double-blind trial of folic acid supplementation. De Wals, P., et al., Spina bifida before and after folic acid fortification in Canada. Video available on YouTube: includes: Two pages with 23 fill-in questionsAnswer Key Get TPT credit for future purchases!Go to your "My Purchases" page. 370-84. Selhub, Properties of food folates determined by stability and susceptibility to intestinal pteroylpolyglutamate hydrolase action. They develop very early in pregnancy when the neural tube, which becomes the brain and the spine, does not close properly. For example, the roots of some plants will grow deeper than others to obtain water. BMJ. 2014. However, it is very difficult for most women to get the daily recommended amount of folate through food alone [7]. China-U.S. Collaborative Project for Neural Tube Defect Prevention. Seyoum, E. As the water level goes down, only the plants with the longer roots will survive. N Engl J Med, 2007. Rate this product and earn TPT CREDIT! Click the green star under this store's name and Follow GertrudeKatzChronicleThen you will be the first to know about sales, freebies and product launches! Folic acid is a B vitamin. The zebras become faster and stronger to escape the lions. Women need 400 micrograms of folic acid every day. Therefore, the parasite must have a good defense mechanism to be able to stay in the human without being killed off or expelled. 3(3): p. 93(6): p. When you give feedback, TPT gives you credits that can lower the cost of future purchases. This is called co-evolution and it is often compared to an evolutionary form of an arms race. Starting folic acid intake after the time in development that the neural tube should have closed (after 6 weeks of pregnancy) will not prevent neural tube defects. 357(2): p. Other individuals that do not exhibit those traits die out and, eventually, their genes are no longer available in the gene pool. 15(9): p. g4554. 128(11): p. When a woman gets folic acid through foods or supplements, her blood folate concentration increases. Folate can be found in foods such as leafy green vegetables, citrus fruits, and beans. 622-6. Next to each purchase, click on the "Provide Feedback" button. Over time and repeated uses of antibiotics, only bacteria that have evolved to be immune to the antibiotics will survive and the antibiotics will no longer be effective in killing off the bacteria. Public Health Nutr, 2012. In fact, the human species is accumulating adaptations constantly to fight disease. Usually, a symmetrical arms race is a result of competition over a resource in an area that is limited. Folic acid has been shown to be effective in preventing neural tube defects in randomized control trials, community intervention programs, and food fortification programs. The amount of folic acid and/or food folate and the length of time it is consumed before pregnancy are the most important factors in achieving a blood folate concentration that is high enough to help prevent neural tube defects. Prevention of Neural Tube Defects: Results of the Medical Research Council Vitamin Study. , in Lancet. Even though women with the MTHFR TT or CT genotype process folate more slowly, they can increase their blood folate concentrations enough to help prevent neural tube defects by taking the recommended daily amount (400 micrograms) of folic acid [11]. 554-60. As the parasite adapts and evolves, the human immune system must adapt and evolve as well. Plants with shorter roots will be forced to adapt by growing longer roots, or they will die. 131-7. This type of evolutionary arms race still results in the co-evolution of the species. Shelnutt, K.P., et al., Methylenetetrahydrofolate reductase 677C->T polymorphism affects DNA methylation in response to controlled folate intake in young women. J Nutr, 1998. Folate in food is easily broken down by heat and light. J Nutr Biochem, 2004. These preferred traits are what makes an individual more fit and able to live long enough to reproduce. N Engl J Med, 1999. Women should eat a balanced diet of food rich in natural folate. Yes. When blood folate concentration is too low, there can be medical issues. Having enough folate in the blood can help improve a woman's health and can reduce her risk of having a pregnancy affected by a neural tube defect [11]. CDC urges all women capable of becoming pregnant to take 400 micrograms of folic acid every day to help prevent neural tube defects (major birth defects of the baby's brain or spine). This is the reason why it is important for doctors not to overprescribe antibiotics every time a patient is sick. Score: 0% Rank: Correct Answer: Start Quiz >> Evolution: The Evolutionary Arms Race Program Overview "Survival of the fittest."—Raw competition? 15(7): p. Berry, R.J., et al., Prevention of neural-tube defects with folic acid in China. 1832-5. As parasites invade the human body, the human immune system will kick in to try to eliminate the parasite. All women, including those who have the MTHFR TT or CT genotype , can benefit from getting 400 micrograms of folic acid each day, especially before and during early pregnancy. Species, in order to evolve, must accumulate adaptations that are favorable for the environment in which they live. The two most common neural tube defects are spina bifida (affects the spine) and anencephaly (affects the brain). N Engl J Med, 1992. The competing plants will keep evolving longer and longer roots, trying to outperform each other and get the water. Most asymmetrical arms races come from a predator-prey relationship of some sort. Humans are not immune to the evolutionary arms race. Folic acid is the more heat-stable form of vitamin B9 and is, therefore, better suited for food fortification since many fortified products, such as bread, are baked [8]. The two species are not evolving the same types of traits, but if one evolves, it creates the need for the other species to also evolve in order to survive. This program explores the spiraling arms race humans have with microorganisms, the only entities that pose a threat to human existence. MTHFR (methyiltetrahydrofolate reductase) is an enzyme that plays a role in how people process folate. 341(20): p. Birth Defects Res A Clin Mol Teratol, 2008. p. Women can get folic acid by taking a vitamin with 400 micrograms of folic acid in it or eating food that is fortified with folic acid (such as some breakfast cereals and foods made with flour enriched with vitamins). Loading... In the case of a symmetrical arms race in evolution, the co-evolving species are changing in the same way. Neural tube defects are serious birth defects of the brain and spine. [2-6] Folic acid is easily absorbed in the body and studies have shown that it can increase blood folate concentrations across populations (including those with the MTHFR TT variant-see below for addition information) [9, 10]. For instance, in the predator-prey relationship between lions and zebras, the result is an asymmetrical arms race. However, folate is a general term used to describe vitamin B9 which comes in different forms. At that point, another treatment will be necessary and force the human to either co-evolve to fight off the stronger bacteria, or find a new cure to which the bacteria are not immune. As these species evolve, other species that are in close symbiotic relationships with those species must also evolve. Give a rating and leave a comment about the product. That means the lions need to become stealthier and better hunters in order to keep eating zebras. Research studies have shown that in populations with high levels of the MTHFR TT or CT genotype, getting 400 micrograms of folic acid daily before and during early pregnancy can reduce the risk of neural tube defects by up to 85% [5, 11]. Students complete worksheet as they watch video. 82(9): p. Doctors often prescribe antibiotics for patients that have a bacterial infection in hopes that the antibiotics will stimulate the immune system and kill off the disease-causing pathogen. Very low blood folate concentrations can cause a form of anemia called megaloblastic anemia. A common variant of the MTHFR enzyme (also known as the MTHFR TT or CT genotypes) determines how fast certain people can process folate. The terms 'folic acid' and 'folate' are often used interchangeably. 135-42. 349: p. 1216-27. and J. If a woman gets enough folic acid before and during early pregnancy, it can help prevent neural tube defects (major defects of the baby's brain or spine). 1956-60. 1485-90. 1991. Nutrients, 2011. Crider, K.S., et al., Population red blood cell folate concentrations for prevention of neural tube defects: bayesian model. These include: folic acid, dihydrofolate (DHF), tetrahydrofolate (THF), 5' 10' methylenetetrahydrofolate (5' 10' MTHF), and 5' methyltetrahydrofolate (5-MTHF) [1]. The effectiveness of supplements containing some form of folate other than folic acid (such as 5-MTHF, or labeled "Natural Folate") for preventing neural tube defects has not been studied. For example a research study showed that after three months of consuming 400 micrograms folic acid, blood folate concentrations increased over 250% among women with the MTFHR TT genotype [9]. Similarly, the phenomenon of antibiotic resistance in bacteria is also a type of evolutionary arms race. Folic acid has been shown to be effective in preventing neural tube defects in many scientific studies and in countries around the world [2-6]. Folic acid is the synthetic (man-made) form that is used in vitamin supplements and in fortified foods such as rice, pasta, bread and some breakfast cereals. Tinker, S.C., et al., Usual folic acid intakes: a modelling exercise assessing changes in the amount of folic acid in foods and supplements, National Health and Nutrition Examination Survey, 2003-2008. De Wals, P., et al., Reduction in neural-tube defects after folic acid fortification in Canada. Or, a level of cooperation indispensable to life? Dudas, Prevention of the first occurrence of neural-tube defects by periconceptual vitamin supplementation. Czeizel, A.E. and I. As the name implies, an asymmetrical arms race will result in the species to adapt in different ways.

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