

ANTIMICROBIAL EFFECTS OF LACTOFERRIN, LYSOZYME AND NICOTINE ON ADHERENT AND NON-ADHERENT BACTERIA. L. Shahrestani*, N. Naidu, J. K. Chan, California Polytechnic Pomona CA 91768

Attachment to host tissue surfaces is a prerequisite for microbial colonization and proliferation. Various innate defense factors on epithelial mucosa could affect the microbial adhesion process. Several glycoproteins and glycoconjugates in mammalian exocrine secretions have been reported to block microbial adhesion. Lactoferrin and lysozyme are broad-spectrum antimicrobial systems present in exocrine secretions including milk, saliva, tears, and seminal fluids that bathe the mucosal surfaces. The adhesion of Gram-negative bacteria such as *Escherichia coli* and Gram-positive bacteria such as *Streptococcus faecalis* to bio-surfaces are regulated by various cellular and milieu factors. These bacterial binding could be partly mediated by non-specific mechanisms such as charge and hydrophobic interactions. On the otherhand, certain strains of these bacteria express high-affinity binding components on their cellular surface and could demonstrate specific interaction with human plasma and extracellular matrix proteins. Such adherent bacteria result in the formation of bio-films and may resist the activity of a number of antimicrobial agents. It is generally believed that antimicrobial agents inhibit the growth-multiplication of non-adherent bacteria much more effectively than their adherent counter parts. Exogenous factors such as food and milieu could influence bio-film formation. Investigations from different laboratories have indicated that smoking could lead to an increased incidence of periodontal diseases. Nicotine, a major component of tobacco has been implicated in the positive outcome of these gum afflictions. Thus, a significant population of smokers suffers from recurrent gum infections. Therefore, a synergistic or antagonistic affects of nicotine on the antimicrobial effects of lactoferrin and lysozyme in the saliva could be important in the pathogenesis of periodontitis. The present study examines the microbial adhesion-blocking activity and bacteriostasis effects of lactoferrin, lysozyme and nicotine (cotinine) against Gram-negative and Gram-positive bacteria. This study also compares the growth-inhibitory effects of lactoferrin and lysozyme on adherent and non-adherent *Escherichia coli* and *Streptococcus faecalis* in different biological matrices.

REPRODUCTIVE STRATEGIES OF THE WESTERN POND TURTLE: TRADE-OFFS AND EFFECTS OF VARYING RESOURCE AVAILABILITY. M. N. Pires, California State Polytechnic University, Pomona, CA 91768.

Several empirical and theoretical studies have focused on the development of optimization models to describe reproductive trade-offs and allocation patterns in sexually reproducing organisms. Despite their historical and practical importance, none of these models have comprehensively explained natural variations in reproductive allocation strategies. Further studies in this area are, therefore, necessary for the development of a more robust conceptual framework that will lead us to a better understanding of ecological and evolutionary processes. I present preliminary results on the analysis of the applicability of the optimum egg size model to a population of the

Southwestern Pond Turtle (*Clemmys marmorata pallida*) from southern California. I am considering data on their reproduction and on resource availability throughout three reproductive seasons to answer the following central questions, derived from the basic assumptions of the optimum egg size model: 1) Is there a trade-off between clutch size and egg size? and 2) Can resource availability be pointed to as a variable responsible for variation in reproductive output? Because of possible morphological constraints on egg size for this species, effects of varying resource availability, which are expected to occur, should be observed in varying clutch size (rather than in egg size), as the model predicts. I expect to provide valuable information on aspects of the reproductive ecology of the Southwestern Pond Turtle. I also expect to generate discussions that will contribute to the understanding of ecological and evolutionary processes in turtles.

HISTOCHEMICAL AND IMMUNOCHEMICAL LOCALIZATION OF AAT AND PAG IN THE RAT BRAIN. G.H. Kageyama¹, L. Shih, and K. Tsai, California State Polytechnic Univ. Pomona CA 91768.

Glutamate is a major excitatory neurotransmitter in the brain, and it is also an amino acid for the biosynthesis of proteins in all kinds of cells. In addition, glutamate is also a precursor in the synthesis of GABA (g-aminobutyric acid). As a result, the production of glutamate can have very different purposes in neurons. The research is aimed to find the location of glutamate production and explore the mechanism of glutamate metabolism in both cellular and subcellular level of the rat brain by investigating the distribution of the two important enzymes that catalyze the formation of glutamate, AAT (aspartate aminotransferase) and PAG (phosphate-activated glutaminase) in the rat brain. The adult rat hippocampus, cerebellum, and retina have been selected for the research because of their clearly defined cellular layer. The distribution of AAT and PAG is detected in two different methods, the histochemical method and the immunochemical method. In the histochemical method, the products of the reaction that the enzymes catalyze are labeled (α -ketoglutarate for AAT and NADH for PAG); therefore, the enzyme activities are localized. In the immunochemical method, the enzymes themselves are labeled by their antibodies and localized directly. From the two types of different approaches, the research is believed to obtain a more holistic understanding of the properties of the two enzymes and the role of them in the glutamate metabolism of the brain.

THE EFFECT OF FOLIC ACID FORTIFICATION TO THE FOOD SUPPLY ON FOLATE STATUS IN WOMEN OF LOW SOCIOECONOMIC STANDING. S.A. Moonie*, M.A. Caudill, and E.A. Cogger, California State Polytechnic Univ. Pomona CA 91768.

Neural tube defects (NTDs) are among the most detrimental of all birth defects, causing possible handicap or death in almost all inflicted children. Each year in the United States, approximately 2500 individuals are born with NTDs and the incidence is highest among low-income women. Numerous studies have indicated that sufficient consumption of folic acid, the synthetic form of the B vitamin folate, during the periconceptional period can reduce the number of births with NTDs by 50% to 75%. In order to increase folic acid consumption, the Food and Drug Administration (FDA) issued a regulation in 1996 mandating that by January of 1998, all enriched flour, rice, cereals, pasta, and other grain products contain 140 μg of folic acid per 100g. The current level of fortification is estimated to provide an additional 100 μg daily of folic acid. This is lower than the Institute of Medicine (1998) recommendation that women of childbearing age consume 400 μg per day of synthetic folic acid, either from fortified foods or supplements. Many experts in the field recommend increasing the level of folic acid fortification, although others caution against it due to potential health risks. To date, no studies have been done to assess the effectiveness of folic acid fortified foods in improving folate status in low-income women. We propose to analyze serum and red cell folate concentrations and homocysteine concentrations (a functional index of folate status) in 52 premenopausal low-income women. These values will be compared with NHANES (National Health and Nutrition Examination Survey) pre-fortification values. We predict post-fortification folate concentrations to be significantly higher among our subject group.