ABSTRACT
(1 page only)

TITLE OF THE PAPER:

THE EFFECTS OF CHRONIC LOW LEVEL CO_2: RELEVANCE TO SPACE

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DESCRIPTION: (**should** clearly present the purpose of your paper and include detailed information on the methods and results of your research)

Carbon dioxide (CO_2) exists in the earth's atmosphere at a concentration of approximately 0.03%. in closed environments, such as space vehicles and submarines the atmospheric concentration is allowed to increase. Acceptable levels have been based on crew health, and the design of the removal system. on Space Station Freedom an additional concern is the effect that increased CO_2 will have on biological function. All organisms, plant and animal, including humans, depend on an aqueous system to support transport of nutrients and was stes and to perform other functions. As CO_2 increases in the pressurized volume it will remain in equilibrium with body fluids, and increase the concentration of bicarbonate and hydrogen ions. Attendant changes in pH and in ionization can have marked effects on bodily functions. Currently the upper allowable chronic limit of CO_2 for space station is 0.7%, approximately 20 times greater than found in the atmosphere. At 0.7% CO_2 a number of changes occur. 'There is a systemic acidosis, increase in respiration, change in renal function and in the deposition and stability of calcium in bones. Early in the exposure bone acts as a buffer, depositing additional calcium as carbonate and bicarbonate. Over the long term their is increasing, conversion of carbonates to bicarbonates. An increase in hydrogen ion will also increase the percentage of calcium in the blood stream that is in the ionized state. It has been recently shown (S1 .S-1) that astronauts already have an significant increase in total calcium and calcium ion in the blood when CO_2 levels arc only at 0.2%. In other mammals , such as guinea pigs, pathological changes arc seen at 0.5% CO_2, and demonstrable physiological changes at 0.3%. At 0.7% CO_2 over aquatic habitats, equilibration of CO_2 with water results in conditions that arc detrimental to some organisms. In conclusion, an atmosphere on Space Station Freedom which contains 0.7%0 CO_2 will make it difficult 10 separate changes due to the microgravity environment. 1 further, in the long term some det rimental or pathological alterations may be seen in humans and in other experimental subjects.