

ISEF Sample Abstract & Certification

A comparative analysis of the granulocyte counts in the blood of humans, monkeys, and dogs through time after acute irradiation

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Acute irradiation can cause deleterious biological effects in humans, such as lowered granulocyte counts in the blood which can be detrimental to the immune system. When characterizing symptoms and preventative measures of ionizing radiation, animal models are often used. Increasing accuracy of animal models will help develop more precise mitigation strategies for the detrimental biological effects caused by acute irradiation. Data from a previous study, Hu & Cucinotta 2011, was used for analysis. The number of days, granulocyte counts, radiation exposure, and the type of animal were compared in DataClassroom. The granulocyte counts over time were compared in each animal individually at the different radiation levels, then for all animals at each specific radiation level, and lastly all animals at all radiation levels were compared. The p values were 0.29, 0.05, and less than 0.01, respectively. This study determined that monkeys are a better animal model than dogs when studying the effects of acute irradiation on granulocyte counts in humans as monkeys have fewer differentiating factors between humans than dogs do. This was determined since monkeys and humans have a reservoir of granulocytes while dogs do not, and monkeys also have a closer radiation threshold of death to humans than dogs. Galactic Cosmic Ray and Solar Particle Event radiation, two types of ionizing radiation found in space, are the main types of space radiation. Understanding how exposure to these types of radiation will affect the human body will lead to decreased risk for astronauts and fewer issues during space missions.

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