A Novel Imaging Technique: Using Fluorescent Dyed Silica Nanoparticles in Identifying Leukemia Biomarkers

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I designed an experiment testing if fluorescent-dyed silica nanoparticles could be used to identify leukemia biomarkers under UV imaging. I hypothesized that if fluorescent-dyed silica nanoparticles were introduced to blood samples combined with leukemia cells, then the nanoparticles would bind to the surface proteins of leukemia cells present in the sample, resulting in a higher luminosity measured from the sample's wavelength at higher concentrations. I set up my experiment by micro pipetting 2.5mL of Rat Blood into 24 test tubes, labeling one half as the control group without leukemia cells, and the other half as my test group with leukemia cells. Then I incubated 10ml of Basophilic Leukemia Cells for three hours, then distributed 50μL of the solution into four out of 12 vials of the test group, then 100μL into the next four vials, and finally 150μL into the last four vials of the test group. Afterward, I added 100μL of Fluorescent Dyed Silica Nanoparticles to each vial, then capped each vial and gently shook them to evenly distribute the contents. The comparison of the wavelength absorbance between the control group and the different concentrations of leukemia cells in the test group vials would determine whether or not the fluorescent-dyed silica nanoparticles bonded to the surface proteins of leukemia cells, consequently, a lower absorbance would mean a higher luminous intensity while a higher absorbancy would mean a lower luminous intensity. In the conclusion of this experiment, the control group had a higher absorbance than the test group, meaning that the nanoparticles had successfully bonded to the leukemia cells, making them identifiable under UV imaging, however, it was also shown that the concentration of leukemia cells had no real effect on the results.

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