Selection of Specific Fluorescent Dyes for the Early Detection of Pancreatic Cancer using Volatile Organic Compounds

Myneni, Chandra Shriya (School: Oregon Episcopal School)

Pancreatic cancer shows the highest mortality rate and, to date, no early detection devices are available. However, early detection could improve the survival rate. This study is conducted to identify the selection of fluorescent dyes that could react with the unique dysregulated breath volatile organic compounds (VOCs) found in pancreatic cancer. Looking at the literature, five VOCs (Acetone, Benzaldehyde, Tetradecane, Hexanal, and Hexane) were selected. The fluorescent dyes (Basic Fuchsin, Eosin Y, Luminol, Methyl Green, Methylene Blue, and Rhodamine) were tested to record the color change in the VOCs. Two fluorescent dyes, Basic Fuchsin and Methyl Green, were selected due to reacting with all five of the VOCs more than the other dyes. These two dyes also showed potential in being used in tandem to assist in the early detection of Pancreatic Cancer due to their large difference in RGB values with Basic Fuchsin having values of (22, 1, 79), (26, 0, 77), and (25, 7, 70) while Methyl Green had values of (21, 95, 125), (27, 110, 140), and (17, 101, 133), when reacting with all five compounds combined. This preliminary study shows the potential of using identified breath VOCs and fluorescent dyes to develop a device.