WIU CENTENNIAL HONORS COLLEGE
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Abstract

Poster

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Use of Carbon Dots as Biosensors

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Drug trafficking is the most illegal business around the world. The drug market value keeps increasing over hundreds of billions of dollars each year. Methamphetamine (MA) is widely used and is becoming a major problem. Abusing MA can lead to an overdose which can result in a coma or even death. Carbon dots (CDs) are environmentally friendly which makes them a great component to use. They have an easy reaction to get luminescent particles which is very helpful when making a drug test. CDs have valued properties and have demonstrated unique biosensing capabilities due to the fluorophoric nature of the material. When CDs are combined with a negatively charged DNA aptamer, the fluorescence produced by the CDs is utilized for the detection of MA. The CDs are derived from malic acid and polyethyleneimine (PEI), which is positively charged, is incorporated into the CD. PEI quenches the fluorescence of the CD. When MA is introduced to the CD, it fluoresces. The fluorescence from the MA indicates that the aptamer released itself from the CDs to bind to the MA indicating a positive result. The fluorescence of the CD correlates linearly with the concentration of MA. This same concept can be applied to any drug that has an equivalent DNA aptamer.