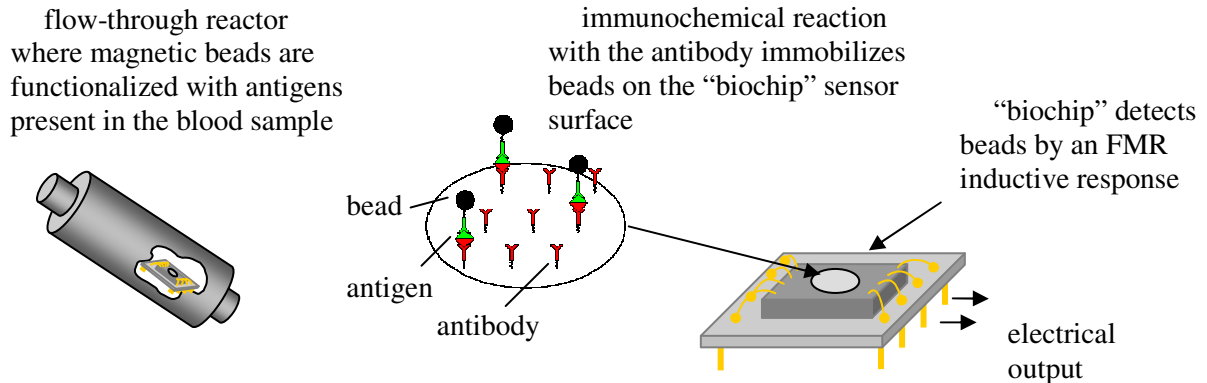


Ferromagnetic Resonance Biochip for Diagnosing Pancreatic Cancer

Pancreatic cancer is the leading cause of death in tumor based cancers. The main hindrance to its early diagnosis is that the tumor does not result in recognizable symptoms (typically, compression of the bile duct) until the cancer has spread well beyond the pancreas. At this stage preventive treatment is no longer a viable option. The American Cancer Society predicts 32,000 deaths, in 2006 alone, due to pancreatic cancer.



Biochip for flow through detection of pancreatic cancer biomarkers (antigens).

We are developing a highly sensitive and non-invasive biochip, as shown in the figure above, for the detection of pancreatic cancer. The proposed technique exploits the immunochemistry between the tell-tale cancer protein biomarkers (antigens) and specific antibodies. Magnetic beads, functionalized for adsorption of the target antigens, will be flowed with the blood sample over an antibody activated sensor area. The immobilization of the beads due to the antigen-antibody binding will confirm the presence of the cancer. The immobilized beads will be detected inductively at the ferromagnetic resonance (FMR) frequency to ensure high sensitivity. The proposed FMR detector will require simple processing using well-established and cost competitive integrated circuit (IC) fabrication technologies thereby permitting an inexpensive and portable biochip to be realized.

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