

TUMOR DETECTION BY TARGETING AND MONITORING INTEGRIN EXPRESSION USING SYNERGISTIC EFFECTS OF MOLECULAR BEACONS AND PEPTIDES

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Background: Integrins are multi-subunit transmembrane proteins involved in a wide range of cellular processes including the induction of new blood vessel formation and tumor metastasis. The growth of new blood vessels, termed angiogenesis, is associated with an altered integrin expression profile whereby tumor cells and the tumor induced neovasculature express the integrin $\alpha\beta3$. This integrin, as well as multiple other integrin dimers, are capable of recognizing proteins and small peptides containing the RGD (arginine-glycine-aspartic acid) motif. Using radiopharmaceuticals in the form of small radiolabeled peptides containing the RGD motif has been used for in vivo imaging, and ligation of therapeutics has been utilized in treatment of $\alpha\beta3$ integrin positive tumors and proliferating blood vessels.

Technology Description: Researchers at Washington University have developed compounds that have motifs that target the compounds to cells that express integrins. In particular, the compounds have peptides with one or more RD motifs conjugated to an agent selected from an imaging agent and a targeting agent. These compounds may be used to detect, monitor, and treat a variety of integrin-mediated biological processes, including the progression of disease states such as diabetes, cardiovascular disease, inflammation and cancer.

Key Advantages:

- Possibility for the use of optical imaging, as opposed to nuclear imaging, can decrease the regulatory burden on production and handling.
- Technology describes the use of a large number of fluorescent imaging agents, nuclear imaging agents, as well as therapeutics to customize the characteristics of the integrin targeting compound.
- The compounds can help monitor a variety of processes, including tumor induced angiogenesis and metastasis.