Office of Technology Transfer

Auburn University

Patient-Specific, Targeted Anti-Cancer System

Overview

Auburn University is seeking a research and commercial partner for development of a technology that is capable of matching anti-cancer drugs to individual cancer patients. This technology is based on the power of cancer cell-specific delivery molecules, identified for individual patients, coupled with anti-tumor agents. It has potential interest and applications for the following economic sectors:

- Pharmaceutical Manufacturers
- Biotechnology Companies
- Diagnostic and Imaging Organizations

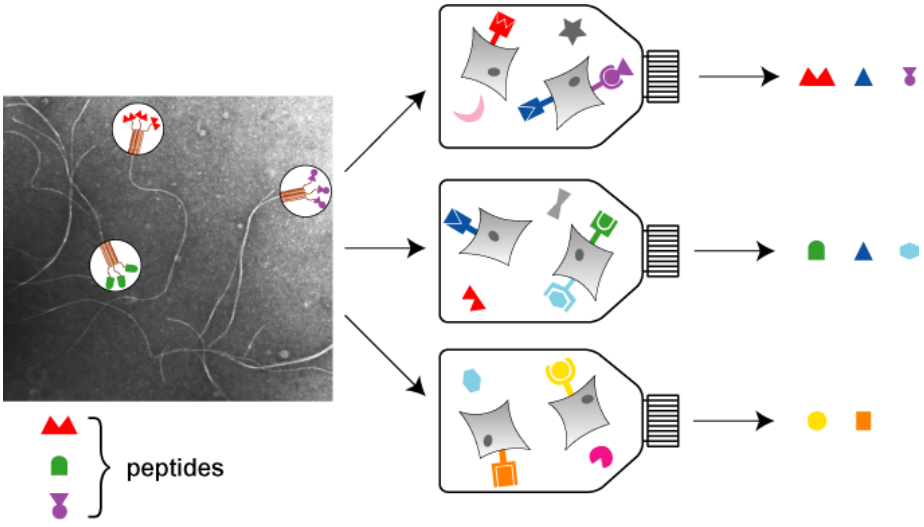
Description

Cancer is a complex disease with molecular, morphological and clinical differences that exist both between and within tumors. Such differences limit the effectiveness of standard therapies which are not patient-specific. To detect molecular differences between tumors from different patients, our technology uses a *phage display* technique: An approach capable of producing valuable binding molecules to known and, importantly, *unknown* cell surface markers.

The binding molecules are selected from libraries of peptides displayed on the surfaces of bacterial viruses called phage. Once selected, each phage particle can be multiplied to large numbers, labeled, and used to probe for specific binding to cancer cells and tissues. Based on the tumor binding profile, an individual drug combination is prepared for the patient's treatment.

Capabilities that are available with the licensable intellectual property and expertise:

- Detection probes for identifying tumor molecular profiles for individual patients
- Binding (targeting) peptides that specifically deliver anti-cancer agents
- Identification of tumor-targeting peptides
- Coupling of targeting peptides with cancer-killing and imaging agents



Identification of targeting peptides. Phage libraries (left) containing phage particles expressing billions of different peptides are mixed with tumor cells (middle). Phage particles that selectively bind to specific tumor cells can be captured and the corresponding targeting peptides isolated (right).

Inventors

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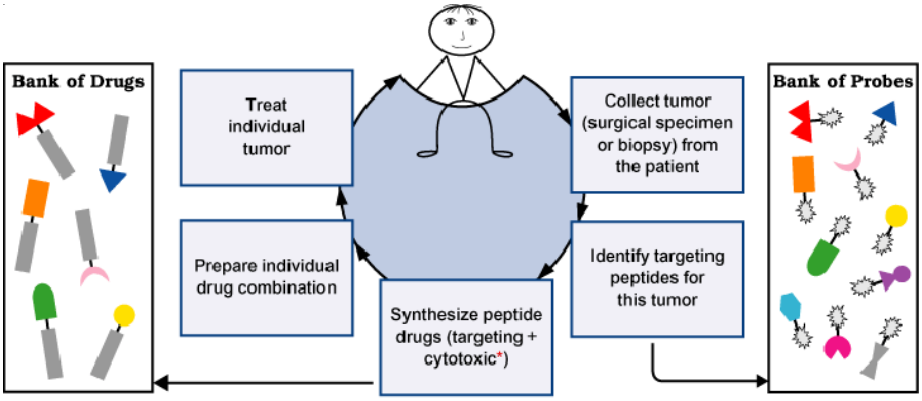

Schematic representation of individualized patient treatment. Targeting peptides are identified using biopsies from multiple cancer patients and placed into two banks. For a bank of probes, targeting peptides are linked to a detection probe. For a bank of drugs, targeting peptides are linked to a cytotoxic agent. Peptide probes are used to establish molecular profiles of individual tumors. Based on these molecular profiles, a patient-specific combination of drugs from the bank of peptide drugs is prepared and the patient is treated. Patients whose biopsies were used for identification of targeting peptides are treated as well.

Advantages

- Improvement of anti-cancer drug effectiveness for primary and secondary (metastatic) tumors
- Selective toxicity for cancer versus normal cells resulting in reduced side effects
- Flexibility allows combination of different drugs with selected targeting molecules
- Can identify specific tumor subtypes
- Process is rapid, not technically complex, and inexpensive

Potential Products/Markets

- Personalized treatment of cancer patients, creating targeted drugs specific for their individual tumors with improved effectiveness
- Identification of key, widespread targeting molecules for broad anti-cancer use
- In vivo imaging applications
- Creation of a bank of detection peptide probes for various tumors (could be started immediately); such a bank could be licensed or used in ex vivo diagnostic applications (which requires relatively minimal approval)*
- Providing services for identification of targeting molecules (could be started immediately)*

**Indicates products that are potentially quick to market*

Status

- Several U.S. and PCT applications have been filed, including 20050260133
- Numerous background patents and applications on targeting peptides for various cell types and tissues
- Multiple publications

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Development opportunities include funded research, joint venture or clinical trials

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Reference: Personalized Anti-Cancer System

***Click here* for a listing of Auburn's available life science technologies**

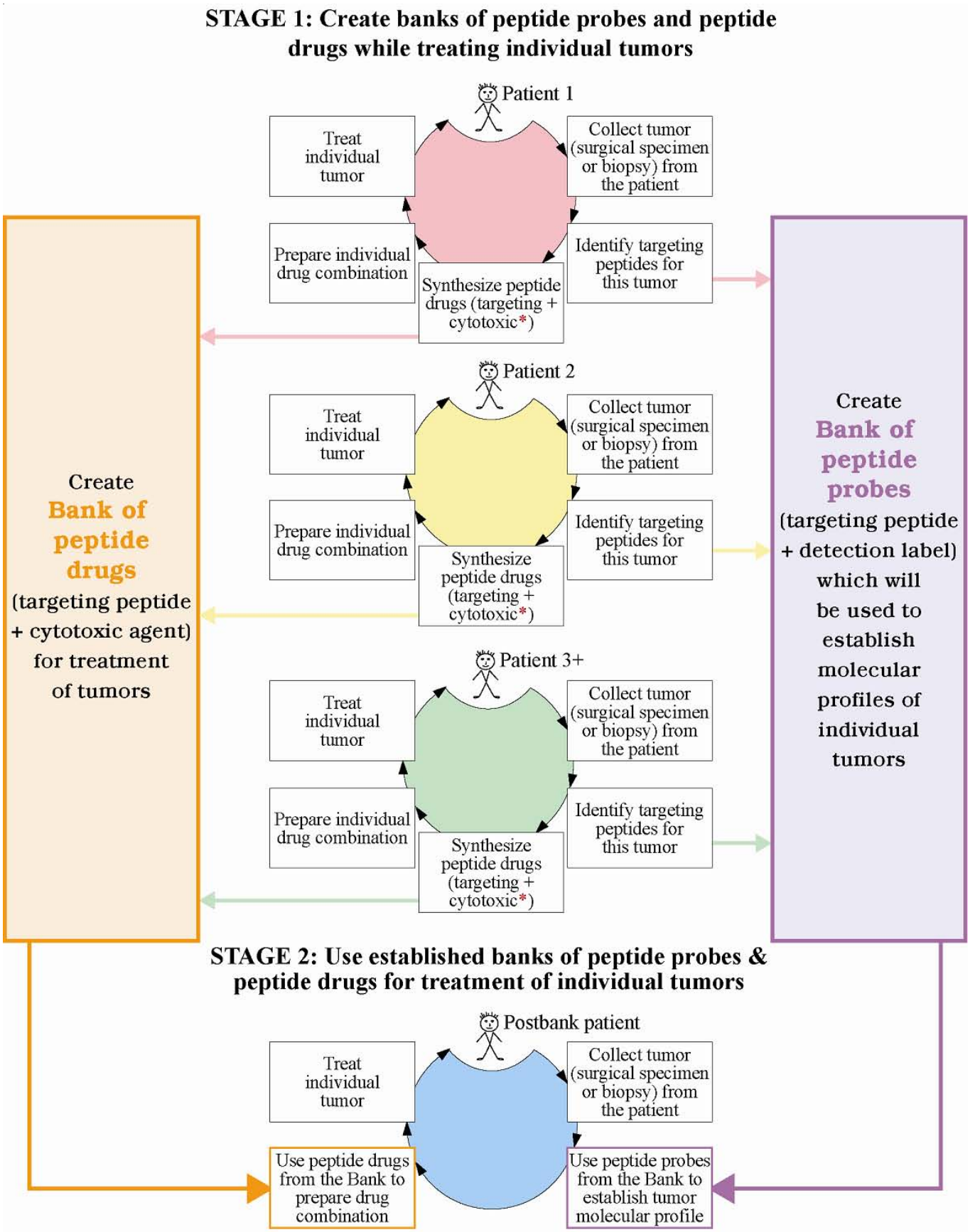

Figure: Schematic representation of a novel strategy in anti-cancer drug design and treatment of individual tumors