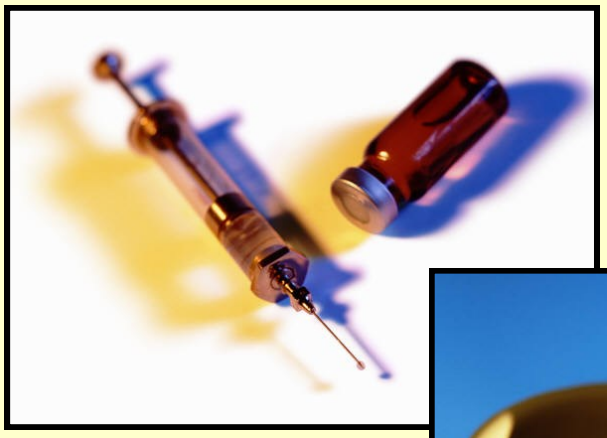
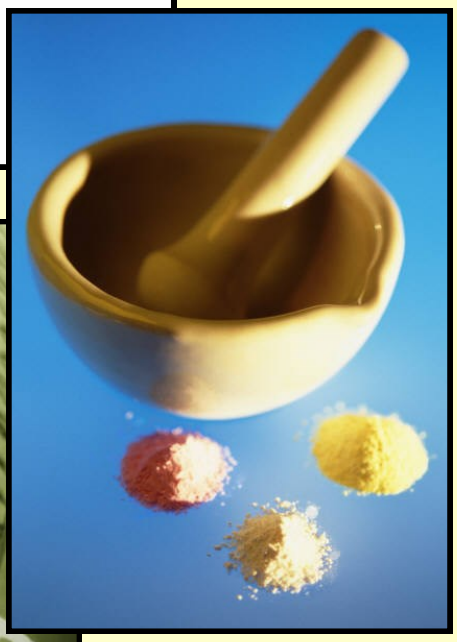
NDSU | RESEARCH FOUNDATION

Medical, Biological & Pharmaceutical Technologies Available for Licensing

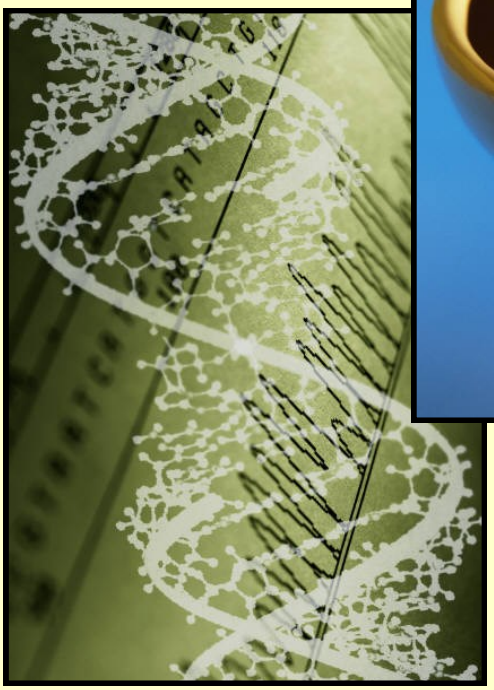
In This Catalog:

Medicine





Pharmacy



Biology

Technologies by Application

Tech No.	Pharmaceutical Technologies
RFT-505	Devices and Methods for Producing Synthetic Silk with Superior Characteristics
RFT-495	Stem Cell Mobilization Boosted 10X to 100X in People with Inadequate Response to Stem Cell Mobilizing Drugs
RFT-485	Targeting Drug/Agent Delivery to Hypoxic Regions of Tumors
RFT-470	Targeted Delivery and Rapid Release of Anti-Cancer Drugs in Tumors
RFT-468	Porcine Circovirus Strain 2 (PCV2) Vaccines and Diagnostic
RFT-456	Peptide Therapeutic Candidate for Treating Conditions Caused by gamma-Herpesvirus
RFT-432	Anti-RAGE Monoclonal and Potential Treatment of Sustained Inflammation in Multiple Disease
RFT-432B	Anti-RAGE Monoclonal for Research Use
RFT-263	Drug Delivery Vehicle for Treatment of Glaucoma and Other Eye Diseases
RFT-72	Novel Chemotherapeutic Agents for Anti-Tumor and Anti-Cancer Drugs
RFT-21	Prophylactic, Therapeutic, and Diagnostic Remedy for Treatment of Colibacillosis Infection

Tech No.	Biomedical Coatings Technologies
RFT-380	Novel PEGylated Compounds and Process for Making Antifouling/Biocompatible Materials
RFT-271	Anti-microbial Coatings Containing Chemically Bound Biocide for Biomedical Applications
RFT-260	'Dual Action' Anti-Microbial Coatings for Implantable Medical Devices
RFT-232	Antibacterial Siloxane Polymer Containing Tethered Anti-Microbial Agent
RFT-214	Unique Anti-fouling and Anti-microbial Coatings for Marine Applications
RFT-179	Novel Environment Friendly Coatings for Marine and Medical Applications

Tech No.	Green Technologies NDSU/RF uses the term "Green" to refer to a technology that results in a positive
RFT-21	Prophylactic, Therapeutic, and Diagnostic Remedy for Treatment of Colibacillosis Infection

Tech No.	Medical Devices
RFT-538	Low-Cost Disposable Device for Manufacture Car T-Cells for Cancer Therapy
RFT-533	Block-Scaffolds for Bone Regeneration using Nanoclay-Polycaprolactone Scaffolds with Supplements
RFT-532	Double Extra-Aortic Counterpropulsion Device
RFT-444	Synthetic Mandible
RFT-427	Total Ankle Replacement

Tech No.	Animal Science
RFT-494	Method for Improving the quality and Quantity of Offspring in Mammals

Tech. No.	Technology Title	Category(ies)
RFT-538	**Low-Cost Disposable Device for Manufacture Car T-Cells for Cancer Therapy** Scientists at NDSU have developed a new device for a scalable, biomanufacturing platform for the production of CAR-modified T-cells while eliminating on-target/off-tumor toxicity and decreasing the current production cost by 500 times (per treatment). The technology relates to a device to produce modified T-cells comprising a first chamber for proliferating a population of T-cells and a second chamber for modifying the T-cells to express a desired T-cell receptor antigen. The modified CAR T-cells can be used to treat cancer.	Medical Devices
RFT-533	**Block-Scaffolds for Bone Regeneration using Nanoclay-Polycaprolactone Scaffolds with Supplements** Scientists at NDSU have developed a flexible, modular, bone scaffold for filling large bone gaps and accelerating bone growth with various additives, such as nutrients, cytokines, therapeutics and minerals incorporated into the scaffold. The scaffold is made of a clay and a polymer. Large bone defect scenarios exist that currently do not have satisfactory solution. These range from nonunion of fractures, excessive fractures with associated bone loss, revision total joint arthroplasty and others. This invention addresses all of these situations by enabling a customized block based nanoclay bone-mimetic scaffold. A defect site of an injured bone can be filled with a scaffold comprising one or more blocks that may be interconnectedThe blocks can be designed in a variety of shapes and sizes and can be prefabricated. The large bone defect space can be treated with bone morphogenetic protein (BMP-2) for example that is incorporated into the scaffold matrix.	Medical Devices
RFT-532	**Double Extra-Aortic Counterpropulsion Device** Scientists at NDSU have developed a double extra-aortic cuff to treat heart failure. Counterpulsation devices (CPDs) have been the most widely used mechanical circulatory support (MCS) devices for treating heart failure (HF) patients. However, these CPDs provide insufficient cardiac output (CO) to meet the needs of New York Health Association (NYHA) ambulatory class IV HF patients. During extra-aortic CPD deflation, retrograde flow may result that reduces the forward kinetic energy (KE) of the aortic flow (AOF) which reduces the potential improvement in CO. To enhance the physiological benefits extra-aortic CPDs we have designed a non-blood contacting extra-aortic two-segmented CPD that can optimize the KE of the AOF and provide additional increase CO to patients' lives.	Medical Devices
RFT-505	**Devices and Methods for Producing Synthetic Silk with Superior Characteristics** Scientists at NDSU have developed a device and methods to produce spider silk that has the ability to produce silk similar to the silk produced by a spider. Our device mimics the pH and ionic gradients found in the natural gland., but also pulls the fiber from the device as opposed to extruding it via pushing. This replicates native shear forces that are important for proper alignment of silk proteins. The result is a solid silk fiber that integrates the natural elements of fiber production (i.e. pressure, pH, and ionic gradients) to more accurately replicate the spider's ability to produce silk. Additionally, application of an electric field to the microfluidic device is a unique combination of microfluidic spinning and electrospinning to create a better fiber.	Pharmaceutical
RFT-495	**Stem Cell Mobilization Boosted 10X to 100X in People with Inadequate Response to Stem Cell Mobilizing Drugs** Scientists at NDSU have developed a method to increase the efficacy of certain stem cell mobilizing drugs, including G-CSF and AMD3100. The method involves blocking the leptin receptor concurrent with administration of these drugs. In experimental studies, this strategy increased mobilization of the currently available mobilizing agents two- to five-fold higher than that observed with the agent alone, accounting for an overall mobilizing increase of ten- to one hundred-fold above baseline, depending on the agent used and treatment regimen. This technology has promise to improve outcomes for individuals with diabetes, and others whose stem cell mobilization is less than desired when taking the drugs described above.	Pharmaceutical

Tech. No.	Technology Title	Category(ies)
RFT-494	**Method for Improving the Quality and Quantity of Offspring in Mammals** Scientists at NDSU have developed a method for predicting and/or confirming the success of pregnancy and/or litter size in mammals as well as devices for field testing of mammal samples for pregnancy success and reproduction prosperity (fecundity). Measuring hematocrit levels or blood oxygen saturation near the time of insemination of a mammal can indicate the likelihood of a successful pregnancy and also predict litter size. These methods can also be used to confirm a successful pregnancy sooner than other methods.	Animal Science
RFT-485	**Targeting Drug/Agent Delivery to Hypoxic Regions of Tumors** Scientists working at North Dakota State University have developed a method to deliver drugs to the hypoxic regions of tumors, which are otherwise difficult to reach and treat. This is accomplished by modifying liposomes or polymersomes in two ways. First, peptides (such as cyclic iRGD) or other compounds that target hypoxic regions are conjugated to the drug carriers, resulting in their concentration in hypoxic tumor regions. Second, the liposomes or polymersomes are further modified using NDSU's proprietary linkers, which prevent their opening except in hypoxic regions. As a result, this technology enables more options for treating and imaging solid tumors with lowered side effects associated with chemotherapy. Optionally, polymersomes that deliver compounds to a tumor can simultaneously carry echogenic bubbles that enable ultrasound imaging to determine when and where they accumulate inside a tumor, and when they have broken open to release their contents (at which time the echogenic properties disappear).	Pharmaceutical
RFT-471	**Polymersomes for Simultaneous Drug/Agent Delivery and Ultrasound Imaging** Scientists working at North Dakota State University have developed a polymersome that delivers anticancer drugs or other compounds (e.g. imaging agent) to a tumor, while simultaneously carrying echogenic bubbles that enable imaging using ultrasound. These polymersomes are redox-sensitive, making them highly stable in circulation, but susceptible to rapid breakdown in the highly reducing environment inside tumor cells. As a result, anti-cancer drugs can be delivered with high efficiency directly to the tumor cytosol. The polymersomes can be tracked using ultrasound to determine when they accumulate around a tumor, and when they have broken open to release their contents (at which time the echogenic properties disappear).	Pharmaceutical
RFT-470	**Targeted Delivery and Rapid Release of Anti-Cancer Drugs in Tumors** Scientists have developed a liposome-based delivery method with potential to reduce chemotherapy side effects while maintaining or even increasing cancer drug efficacy. The liposome is stabilized in the bloodstream using polyethylene glycol (PEG) and remains stable in the vicinity of healthy cells. However, upon arrival at a tumor the liposome rapidly disintegrates, releasing its contents to be taken up by tumor cells. This disintegration is triggered by conditions found in the tumor extracellular matrix (ECM), specifically the reducing conditions and the presence of Matrix Metalloproteinase 9 (MMP-9). As a result, these liposomes can carry drugs and imaging agents to tumors, releasing them so that a high concentration is available for rapid uptake into tumor cells, and reducing the amount of time these agents spend in the circulatory system or in the vicinity of healthy cells. A reduction in tumor growth was observed using this technology to deliver drugs in a mouse model of pancreatic cancer.	Pharmaceutical
RFT-468	**Porcine Circovirus Strain 2 (PCV2) Vaccines and Diagnostic** Scientists at NDSU have mapped the putative protective and non-protective regions of the PCV2 capsid protein. The key concept for this disclosure is that eliminating or altering the non-protective regions resulted in creation of negative selection markers for the development of the DIVA immunoassay. Additionally, removal of non-protective regions to rationally redesign the antigen is expected to improve vaccine efficacy against both PCV2a and b subtypes and reduce viral shedding, when compared to exisitng vaccines.	Pharmaceutical

Tech. No.	Technology Title	Category(ies)
RFT-456	**Peptide Therapeutic Candidate for Treating Conditions Caused by gamma-Herpesvirsus** Scientists at Epstein-Barr, Kaposi's Sarcoma, and other gamma-herpesviruses (?HV) infect over 95% of humans. The viruses are normally kept in check by the immune system, but (especially in stressed, or immunocompromised patients), the viruses may lead to malignant tumors, Epstein-Barr syndrome, infectious mononucleosis, and other diseases. There is no treatment for any of these diseases. Instead, the best current option is to 'manage' the condition. Potential therapeutic treatment is hindered because humans have proteins that are very similar to the key herpesvirus proteins. A viable treatment must disrupt the viral proteins, while leaving the human versions unimpaired. A key viral protein required for progression from benign to a disease state is Bcl-2. Scientists at NDSU have developed a peptide that selectively inhibits viral Bcl-2, but not the human protein. As a result, this peptide has strong potential as a therapeutic to treat conditions associated with activation of HV.	Pharmaceutical
RFT-444	**Artificial Bone Forms and Compositions for Approximating Bone** Engineers working at NDSU have created an artificial composition that has the same characteristics as the human jaw bone, which can currently be used for surgical testing and/or a practice platform for dentistry students. Dental and medical schools must train students on human bone which requires special research approval, and supplies of human bone are not always available. The composition invented at NDSU mimics the geometry, size, and mechanical and physical properties of actual human bone, but is made from artificial materials that are readily available. With further development, these materials could also be biocompatible with the human body and could itself be used as a replacement for actual human bone with the potential that it could be surgically implanted in the body without fear of rejection. Its potential compositional make-up may allow actual growing human bone to integrate into it. The ceramic composite used is closely allied to materials already in use for dental procedures involving the replacement of enamel and the sealing of cavity fillings.	Devices
RFT-432	**Anti-RAGE Monoclonal and Potential Treatment of Sustained Inflammation in Multiple Diseases** Scientists at NDSU have developed a monoclonal antibody that inhibits activation of the receptor for advanced glycation end products (RAGE). The antibody binds the V-domain to block activation of RAGE by its ligands. This domain is capable of binding to multiple structurally and functionally diverse ligands, all of which trigger signal transduction by RAGE's cytosolic domain, and result in sustained inflammation that is associated with diabetes, cancers, Alzheimer's, multiple sclerosis, and other diseases associated with chronic inflammation. As a result, the anti-RAGE monoclonal antibodies have potential to treat a wide variety of diseases, and in some cases might reduce or slow progression.	Pharmaceutical
RFT-432B	**Anti-RAGE Monoclonal for Research Use** This technology is a monoclonal antibody recognizing the V domain of the receptor for advanced glycation endproducts (RAGE). RAGE is emerging as a biomarker in many human diseases such as diabetes, cancer and Alzheimer's disease. In animal models, antibodies against RAGE have shown to reduce RAGE deleterious signaling. RAGE is a cell-surface receptor that is activated by several ligands. RAGE is therefore a suitable target for monoclonal antibodies. We have generated monoclonal antibodies with the aim of blocking RAGE/ligand interaction and decreasing RAGE deleterious effects in several human diseases.	Pharmaceutical
RFT-427	**Total Ankle Replacement** Engineers working at NDSU have discovered an improved design and material for Total Ankle Replacements (TARs) which allow an easier surgery, and therefore a quicker recovery time. It also performs better and has a longer life expectancy than those being used today. Most of the current TARs are of the two or three-component design. Current TAR designs have only a 75-80% survival rate after 10 years as compared to the current total knee replacement survival of 80% after 20 years. NDSU's design has a projected survival rate comparable to that of current total knee replacement devices. Part of the reason is that the NDSU TAR is comprised of composite materials that can withstand the loads and movements subjected upon an ankle in everyday life. The materials also conform to biocompatibility standards and therefore avoid rejection from the body. These composite materials have mechanical characteristics similar to bone, have a lower wear rate, are not affected by sterilization, and are already FDA approved for implementation.	Devices

Tech. No.	Technology Title	Category(ies)
RFT-380	**Novel PEGylated Compounds and Process for Making Antifouling/Biocompatible Materials** This invention involves the synthesis of a novel siloxane-PEG copolymer with a terminal amine functionality and a backbone of siloxane having a varied number of pendant hydrophilic PEG chains. The synthetic approach involves the precise control over the number of hydrophilic PEG chains, siloxane and PEG chain lengths, and terminal amine functionality. Basically this is a paint additive which will give a better "slip rate" to the paint. This produces a better finish in that it is glossy, has better mechanical properties and surface flow which reduces surface tension.	General Marine Biomedical
RFT-271	**Anti-Microbial Coatings Containing Chemically Bound Biocide for Biomedical Application** Scientists at NDSU have recently invented a novel antimicrobial coating that demonstrates activity towards microorganisms that are associated with infection of implanted medical devices. This innovation therefore, has applications as antimicrobial coatings on medical devices such as prosthetic heart valves, urinary catheters, and a variety of orthopedic implants. These compositions are derived from acrylic polyols that contain chemically bound (tethered) biocide moieties and are completely environment-friendly.	Biomedical Coating Green
RFT-263	**Drug Delivery Vehicle for Treatment of Glaucoma and Other Eye Diseases** Scientists at NDSU (in collaboration with University of Central Florida) have developed a potential ophthalmic drug delivery vehicle for treatment of glaucoma and other ocular diseases. The method uses functionalized cerium oxide nanoparticles (nanoceria), which can be combined with small molecule active ingredients to form a complex that facilitates higher efficiency delivery of drugs into the eye. This technology may provide an alternative to injections for delivering medicines into the eye. The mechanism of improved drug delivery is thought to be the longer residence time on the eye surface, combined with sustained release that will be promoted using nanoceria. Together, these features are expected to provide significantly enhanced delivery of active ingredients to their site of action. Additionally, a fluorophore can be attached to nanoceria, to enable the tracking of the nanoparticles.	Pharmaceutical
RFT-260	**'Dual Action' Anti-Microbial Coatings for Implantable Medical Devices** Scientists at NDSU have invented a unique 'dual action' anti-microbial polysiloxane coating that has the capability of exhibiting long-term anti-microbial activity on implantable medical devices. The coatings have a leachable silver-based anti-microbial domain in conjunction with a surface-bound contact active microbial agent—Quaternary Ammonium salt (QAS) that exhibits the two levels of anti-microbial protection. While the covalently bound QAS groups inhibits bio-film formation by microorganisms that come into contact with the coating prior to insertion of the devices into the body, the leachable anti-microbial agent inhibits bio-film formation by microorganisms in the vicinity of the device.	Biomedical Coating

Tech. No.	Technology Title	Category(ies)
RFT-232	**Antibacterial Siloxane Polymer Containing Tethered Anti-Microbial Agent** This NDSU invention pertains to the development of a polymer material that exhibits superior sustained release of therapeutic levels of the active antibiotic (levofloxacin) when compared to simple physical bending or doping technologies. The material is prepared by combining a powerful, broad spectrum antibiotic (Levofloxacin), tethered to a siloxane polymer. This invention can potentially be used to coat a variety of biomedically implanted devices for prevention of microbial infection.	Biomedical Coating
RFT-179	**Novel Environment Friendly Coatings for Marine and Medical Applications** Scientists at North Dakota State University have combined biocidal and fouling release activities into a single polymeric formulation to develop a unique environmentally friendly coating that holds promise in both marine and medical applications. This novel formulation consists of biocidal moieties that are tethered to its polymer matrix, which in turn prevent them from leaching into the environment. Studies have demonstrated this biocidal moiety to be capable of killing several types of marine organisms that come in contact with the coating surface. Their complementary fouling release property enables those marine organisms not affected by the biocide to be easily sloughed off. Besides marine applications, this coating has been shown to render anti-microbial properties on medical devices.	Biomedical Coating
RFT-72	**Novel Chemotherapeutic Agents for Anti-Tumor and Anti-Cancer Drugs** This invention relates to novel, substituted (functionalized) polysiloxane compositions (and methods for synthesis of same) that may be useful as antineoplastics (chemotherapeutics) or other therapeutic agents for cancer treatment. Since compositions of this type can transverse cellular membranes, they may also serve as delivery vehicles for other agents with biological activities in both animals and plants (e.g., drugs, herbicides, fungicides, anti-microbials, etc.). A thorough contextual discussion of proposed synthesis and possible drug protocol strategies are included.	Pharmaceutical
RFT-21	**Prophylactic, Therapeutic, and Diagnostic Remedy for Treatment of Colibacillosis Infection** Scientists at North Dakota State University have cloned and sequenced the *iss* (increased serum survival) gene from virulent avian *Escherichia coli* strains and expressed its encoded ISS polypeptide sequence. This has enabled them to conduct studies in understanding the gene's potential and devise strategies to detect and control the colibacillosis infection that the gene is believed to cause. This invention pertains to the application of this study in formulating DNA vaccines and immunogenic compositions for providing adequate prophylactic, therapeutic and diagnostic remedies against the colibacillosis infection in humans and avian organisms. Applications of this invention could be in: Veterinary: Avian DNA vaccine for colibacillosis (in chickens, turkeys, waterfowl) and potential diagnostics. Human: Potential human vaccine against urinary tract infections caused by *E. coli.*	Pharmaceutical Green

For Further Information visit our website:

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Biology and Medicine

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