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Stephen BADYLAK

Regeneration Grafts

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http://www.dailymail.co.uk/pages/live/articles/technology/technology.html?in_article_id=563099&in_page_id=1965&ct=5

foxnews.com (Thursday, May 01, 2008)
http://www.foxnews.com/story/0,2933,353636,00.html

'Pixie Dust' From Pig's Bladder Regrows Man's Finger

With the help of an experimental powder, a man's severed finger has regrown to its original length in just four weeks, reports London's Daily Mail.

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[Stephen Badylak, a senior research scientist at Purdue University, holds a piece of material harvested from a pig's bladder.]

Lee Spievack, of Cincinnati, who sliced almost half an inch off the top of one of his fingers, described the powder as “pixie dust,” according to the newspaper.

The “pixie dust” is actually extra-cellular matrix, bursting with collagen and is made from a dried pig’s bladder, the newspaper reports.

The dust was designed to regenerate damaged ligaments in horses, the Daily Mail said.

Collagen is known to give skin strength and elasticity. It is thought that the dust kick-starts the body's natural healing process by sending out signals that mobilize the body's own cells into repairing the damaged tissue, according to the newspaper.

Spievack said his finger even has a fingernail and fingerprint.

Spievack injured his finger three years ago when it got caught in the propeller of a model plane. He did not want a skin graft, opting instead to try the “pixie dust.”

“There are all sorts of signals in the body,” said Dr. Stephen Badylak of the McGowan Institute for Regenerative Medicine at the University of Pittsburgh. “We have signals that are good for forming scar tissue and others that are good for regenerating tissues.

"One way to think about these matrices is that we've taken out many of the stimuli for scar tissue formation and left those signals which were always there for constructive remodeling."

Essentially, the powder directs tissues to grow fresh instead of forming a scar.

Spievak has not lost any bone, nerves or tendon material.

Video : http://news.bbc.co.uk/2/hi/health/7354458.stm
BBC NEWS: http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7354458.stm (2008/04/30)

The Man Who Grew a Finger

By Matthew Price
BBC News, Ohio

In every town in every part of this sprawling country you can find a faceless sprawling strip mall in which to do the shopping.

Rarely though would you expect to find a medical miracle working behind the counter of the mall's hobby shop.

That however is what Lee Spievak considers himself to be.

"I put my finger in," Mr Spievak says, pointing towards the propeller of a model aeroplane, "and that's when I sliced my finger off."

It took the end right off, down to the bone, about half an inch.

"We don't know where the piece went."

The photos of his severed finger tip are pretty graphic. You can understand why doctors said he'd lost it for good.

Today though, you wouldn't know it. Mr Spievak, who is 69 years old, shows off his finger, and it's all there, tissue, nerves, nail, skin, even his finger print.

'Pixie dust'

How? Well that's the truly remarkable part. It wasn't a transplant. Mr Spievak re-grew his finger tip. He used a powder - or pixie dust as he sometimes refers to it while telling his story.

Mr Speivak's brother Alan - who was working in the field of regenerative medicine - sent him the powder.

For ten days Mr Spievak put a little on his finger.

"The second time I put it on I already could see growth. Each day it was up further. Finally it closed up and was a finger.

"It took about four weeks before it was sealed."

Now he says he has "complete feeling, complete movement."

The "pixie dust" comes from the University of Pittsburgh, though in the lab Dr Stephen Badylak prefers to call it extra cellular matrix.

Pig's bladder

The process he has been pioneering over the last few years involves scraping the cells from the lining of a pig's bladder.

Please turn on JavaScript. Media requires JavaScript to play.

How it works in detail The remaining tissue is then placed into acid, "cleaned" of all cells, and dried out.

It can be turned into sheets, or a powder.

It looks like a simple process, but of course the science is complex.

"There are all sorts of signals in the body," explains Dr Badylak.

"We have got signals that are good for forming scar, and others that are good for regenerating tissues.

"One way to think about these matrices is that we have taken out many of the stimuli for scar tissue formation and left those signals that were always there anyway for constructive remodelling."

In other words when the extra cellular matrix is put on a wound, scientists believe it stimulates cells in the tissue to grow rather than scar.

If they can perfect the technique, it might mean one day they could repair not just a severed finger, but severely burnt skin, or even damaged organs.

Clinical trial

They hope soon to start a clinical trial in Buenos Aires on a woman who has cancer of the oesophagus.

The normal procedure in such cases is often deadly. Doctors remove the cancerous portion and try to stretch the stomach lining up to meet the shortened oesophagus.

In the trial they will place the extra cellular matrix inside the body from where the portion of oesophagus has been removed, and hope to stimulate the cells around it to re-grow the missing portion.

So could limbs be re-grown? Dr Badylak is cautious, but believes the technology is potentially revolutionary.

"I think that within ten years that we will have strategies that will re-grow the bones, and promote the growth of functional tissue around those bones. And that is a major step towards eventually doing the entire limb."

That kind of talk has got the US military interested.

They are just about to start trials to re-grow parts of the fingers of injured soldiers.

Skin burns

They also hope the matrix might help veterans like Robert Henline re-grow burnt skin.

He was almost killed in an explosion while serving in Iraq. His four colleagues travelling with him in the army Humvee were all killed.

He suffered 35% burns to his head and upper body. His ears are almost totally gone, the skin on his head has been burnt to the bone, his face is a swollen raw mess.

So far he has undergone surgery 25 times. He reckons he has got another 30 to go.

Anything that could be done in terms of regeneration would be great he says.

"Life changing! I think I'm more scared of hospitals than I am of going back to Iraq again."

Like any developing technology there are many unknowns. There are worries about encouraging cancerous growths by using the matrix.

Doctors though believe that within the so called pixie dust lies an amazing medical discovery.

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http://www.esquire.com/features/esquire-100/pigfinger1007
http://www.esquire.com/features/esquire-100/pigfinger1007-2

Badylak's Patents

Vascularization Enhanced Graft Constructs
NZ536563

Abstract --- A tissue graft construct for use in repairing diseased or damaged tissues is provided. The tissue graft construct comprises a tissue material comprising submucosa selected from the group consisting of urinary bladder submucosa and stomach submucosa, and extracts and hydrolysates thereof, added endothelial cells, and at least one additional preselected, exogenous population of cells, and wherein the tissue graft construct is seeded in vitro with the added cells. The preselected population of cells can be a population of non-keratinized or keratinized epithelial cells or a population of mesodermally-derived cells selected from the group consisting of fibroblasts, smooth muscle cells, skeletal muscle cells, cardiac muscle cells, multi-potential progenitor cells, pericytes, osteogenic cells, and any other suitable cell type, preferably selected based on the tissue to be repaired. Methods for enhancing the vascularization in vivo of these tissue graft constructs and for preparing these graft constructs are also provided.

WOUND HEALING POLYMERIC NETWORKS
CA2613540

Abstract --- A composition includes at least one biologically active agent covalently attached to a first polymerizing molecule that is adapted to undergo a free radical polymerization. The first polymerizing molecule retains the ability to undergo free radical polymerization after attachment of the bioactive agent thereto. The first polymerizing molecule is preferably biocompatible. The polymerizing molecule can, for example, be dihydroxyphenyl-L-alanine (DOPA) or tyrosine. The composition can also include a second component synthesized by reacting at least one core molecule having a plurality of reactive hydrogen groups with at least one multi-isocyanate functional molecule to create a conjugate including terminal isocyanate groups. The conjugate molecule is reacted with a second polymerizing molecule that is adapted to undergo a fre e radical polymerization. The second polymerizing molecule includes a reactive hydrogen to react with the isocyanate groups of the conjugate. The second polymerizing molecule retains the ability to undergo the free radical polymerization after reaction with the conjugate. In several embodiments, th e first polymerizing molecule and the second polymerizing molecule are the sam e and dihydroxyphenyl-L-alanine (DOPA) or tyrosine.

Decellularized Liver for Repair of Tissue and Treatment of Organ Deficiency
US2008058956

Abstract --- The present invention provides a liver-derived devitalized mammalian parenchymatous tissue composition which includes an interstitial structure of connective tissue which can serve as a scaffold for tissue repair or regeneration. The devitalized mammalian parenchymatous tissue composition can further include the basement membrane of the tissue.

BIOHYBRID ELASTOMERIC SCAFFOLDS AND METHODS OF USE
WO2008008266

Abstract --- Provided herein is a biohybrid elastomeric scaffold comprising a synthetic polymeric component and a biological polymeric component. The scaffold can be fabricated to have many different forms, non-limiting examples of which include a non-woven fibrous mesh or in a porous composite. Methods of use of the biohybrid elastomeric scaffolds in wound healing and tissue regeneration are also provided.

PERFORATED SUBMUCOSAL TISSUE GRAFT CONSTRUCTS
JP2007289734

Abstract --- PROBLEM TO BE SOLVED: To provide a perforated unitary multi-laminar tissue graft construct and a method for preparing such construct.
SOLUTION: This method includes: a step of overlapping strips of submucosa tissue with other strips of submucosal tissue; a step of compressing at least the overlapped portions of the strips between two surfaces under conditions that allow or promote dehydration of the compressed submucosa sheets; and a step of perforating the resulting unitary tissue graft construct. The perforated tissue graft compositions have enhanced mechanical and remodeling properties relative to non-perforated submucosal tissue grafts.

ARTIFICIAL VASCULAR VALVES
JP2007222662

Abstract --- PROBLEM TO BE SOLVED: To prepare tissue valve formations from submucosal tissue and to provide a method and an artificial tissue valve for replacing or fixing damaged or diseased heart and vascular valves of a warm-blooded vertebrate using these valve formations.
SOLUTION: One method shows that sheets of submucosal tissue are shaped into a tubular structure by spirally wrapping the sheet of submucosal tissue 2 around a cylindrical mandrel 12 of the appropriate diameter and by compressing the overlapped tissue under dehydrating conditions. The mandrel 12 is a hollow cylinder made of plastic or metal having a plurality of holes 16 formed in the cylinder wall. The compression of the tissue can be achieved by forming a seal at one end of the mandrel 12 and pulling a vacuum through the lumen of the mandrel 12. The final seam of the spirally wrapped tissue can be further secured by sutures, spot-welding with heat or treating the seam with glutaraldehyde.

Composition and Method for Production of Transformed Cells
US2007202599

Abstract --- A composition useful for the production of transformed eukaryotic cells is described. The composition comprises submucosal tissue and a nucleic acid sequence. The nucleic acid sequence is typically recombinant DNA including gene(s) encoding for one or more biofunctional proteins. The submucosal tissue component of the present composition comprises the tunica submucosa of vertebrate intestine delaminated from the tunica muscularis and at least the luminal portion of the tunica mucosa. Injection or implantation of the composition into a host induces the formation of transformed cells capable of expressing gene(s) encoded by the nucleic acid sequence.

EXTRACELLULAR MATRIX BASED GASTROESOPHAGEAL JUNCTION REINFORCEMENT DEVICE
WO2007084278

Abstract --- Provided are medical devices for implantation in patients having suffered the loss of or damage to at least part of their esophagus. The medical device connects the esophagus or remaining part thereof with the stomach to form a gastro-esophageal junction that promotes healing and encourages new host tissue growth while distributing the load arid decreasing tension at the anastomotic site. The medical device comprises extracellular matrix shaped into a conformation that more closely approximates the geometry of the native gastro-esophageal junction than does direct attachment of the stomach to the shortened esophagus. Molds useful in manufacturing the medical device and methods of use of the device are also described herein.

Extracellular Matrix Based Gastroesophageal Junction Reinforcement Device
US2007166396

Abstract --- Provided are medical devices for implantation in patients having suffered the loss of or damage to at least part of their esophagus. The medical device connects the esophagus or remaining

part thereof with the stomach to form a gastro-esophageal junction that promotes healing and encourages new host tissue growth while distributing the load and decreasing tension at the anastomotic site. The medical device comprises extracellular matrix shaped into a conformation that more closely approximates the geometry of the native gastro-esophageal junction than does direct attachment of the stomach to the shortened esophagus. Molds useful in manufacturing the medical device and methods of use of the device are also described herein.

Enhanced Submucosal Tissue Graft Constructs
US6087157

Abstract --- An improved tissue graft construct comprising submucosa of a warm-blooded vertebrate and a preselected group of eukaryotic cells are described. The improved tissue graft constructs can be used in accordance with the present invention to enhance the repair of damaged or diseased tissues in vivo.

SUBMUCOSA AS GROWTH SUBSTRATE FOR CELL
JP2007105031

Abstract --- PROBLEM TO BE SOLVED: To provide a cell culture method which promotes proliferation and tissue differentiation of eukaryotic cells in vitro.
SOLUTION: Cell growth of cell/tissue culture is improved by using submucosal tissue of warm-blooded vertebrate as the substrate of in vitro cell/tissue proliferation. A collagen substrate environment similar to an environment found in vivo is provided to cells in vitro by a submucosal tissue cell growth substrate. The submucosal tissue promotes proliferation and differentiation of eukaryotic cells when the cells are brought into contact with submucosal tissue under conditions inducive to cell proliferation.

BIOMATERIAL DERIVED FROM VERTEBRATE LIVER TISSUE
ES2263185T

Abstract --- A tissue graft composition comprising liver basement membrane is described. The graft composition can be implanted to replace or induce the repair of damaged or diseased tissues.

Wound healing polymeric networks
US2007014755

Abstract --- A composition includes at least one biologically active agent covalently attached to a first polymerizing molecule that is adapted to undergo a free radical polymerization. The first polymerizing molecule retains the ability to undergo free radical polymerization after attachment of the bioactive agent thereto. The first polymerizing molecule is preferably biocompatible. The polymerizing molecule can, for example. be dihydroxyphenyl-L-alanine (DOPA) or tyrosine. The composition can also include a second component synthesized by reacting at least one core molecule having a plurality of reactive hydrogen groups with at least one multi-isocyanate functional molecule to create a conjugate including terminal isocyanate groups. The conjugate molecule is reacted with a second polymerizing molecule that is adapted to undergo a free radical polymerization. The second polymerizing molecule includes a reactive hydrogen to react with the isocyanate groups of the conjugate. The second polymerizing molecule retains the ability to undergo the free radical polymerization after reaction with the conjugate. In several embodiments, the first polymerizing molecule and the second polymerizing molecule are the same and dihydroxyphenyl-L-alanine (DOPA) or tyrosine.

Stent with reduced thrombogenicity

EP1704835

Abstract --- A tissue graft construct and method for repairing the inner linings of damaged or diseased vertebrate vessels are described. The method comprises the steps of positioning a tissue graft construct within a blood vessel at a site in need of repair. The tissue graft construct comprises a stent (3) covered with submucosal tissue (4) wherein the stent (3) is formed for receiving the distal end of a catheter (1) having an inflatable balloon (2).

STOMACH SUBMUCOSA DERIVED TISSUE GRAFT
DE69734218T

Abstract --- A tissue graft composition comprising stomach submucosal tissue delaminated from both the luminal portion of the tunica mucosa and the smooth muscle layers of the muscularis externa of a stomach of a warm blooded vertebrate is described. The graft composition can be or implanted into a host to replace or support damaged or diseased tissues.

Artificial vascular valves
EP1671604

Abstract --- A method for preparing vascular valves from submucosal tissue is described. The artificial vascular valves of the present invention are useful for replacing damaged or diseased valves of a warm-blooded vertebrae.

Large area submucosal tissue graft constructs
DK0821590T

Abstract --- A unitary heterolaminar tissue graft construct is prepared by fusing partially overlapped strips or sheets of submucosa tissue. The submucosa components are fused by compressing at least the overlapped positions of said strips between two surfaces under conditions that allow or promote dehydration of the compressed submucosa sheets. Three dimensional graft constructs can be prepared by using complementary non-planar compressive surfaces.

Vascularization enhanced intestinal submucosa tissue graft constructs
NZ536611

Abstract --- An intestinal submucosa tissue graft construct for use in repairing diseased or damaged tissues in non-human animals is provided. The graft construct comprises vertebrate intestinal submucosa tissue, added endothelial cells, and at least one additional preselected, exogenous population of cells, which enhances initiation of the formation of vessel-like structures in the graft. The preselected population of cells can be a population of non-keratinized or keratinized epithelial cells or a population of mesodermally derived cells selected from the group consisting of fibroblasts, smooth muscle cells, skeletal muscle cells, cardiac muscle cells, multi-potential progenitor cells, pericytes, osteogenic cells, and any other suitable cell type, preferably selected based on the tissue to be repaired. Methods for enhancing the vascularization in vivo of these intestinal submucosa tissues graft constructs and for preparing these grafts constructs are also provided.

CONDITIONED MATRIX COMPOSITIONS FOR TISSUE RESTORATION
EP1644011

Abstract --- The invention provides a composition conditioned for the remodeling, restoration, repair, or replacement of tissue within a host. The composition is conditioned by culturing cells on the matrix and/or by exposing the cultured cells or matrix to one or more stressors.

BLADDER RECONSTRUCTION METHOD AND TISSUE GRAFT FOR
JP2005349213

Abstract --- PROBLEM TO BE SOLVED: To provide a method of replacing a surgically removed bladder defect part in order to promote regrowth of endogenous urinary bladder tissue.

SOLUTION: The damaged bladder tissue is surgically replaced with a tissue graft structure made of submucosal tissue of a warm blooded vertebrate formed in the bladder-like shape. The submucosal tissue includes a lumen part of the mucosa layer and a mucosal lower layer separated from a muscular coat.

SCAFFOLD FOR CELL GROWTH AND DIFFERENTIATION
US2004175366

Abstract --- The present invention provides a devitalized mammalian parenchymatous tissue composition which includes an interstitial structure which can serve as a scaffold for tissue repair or regeneration. The devitalized mammalian parenchymatous tissue composition can further include the basement membrane of the tissue.

BONE TRANSPLANTATION COMPOSITION
JP2005161062

Abstract --- PROBLEM TO BE SOLVED: To provide a restoring guidance method for a damaged bone or a diseased bone. SOLUTION: In order to restore and guide the damaged bone or the diseased bone, a process to transplant the effective dose of a powdery biodegradable bone transplantation composition to a damaged or diseased sector is provided. The above-mentioned bone transplantation composition comprises a submucosa exfoliated from a luminal part of the intestines section of a vertebrate, or its digests. It is a powdery material which is compressed into a given three-dimensional shape before a transplantation. It is transplanted to the damaged bone or the diseased bone.

Tubular submucosal graft constructs
AU2004216679

Biomaterial derived from vertebrate liver tissue
US2005019419

Abstract --- A tissue graft composition comprising liver basement membrane and a method of preparation of this tissue graft composition are described. The graft composition can be implanted to replace or induce the repair of damaged or diseased tissues.

Conditioned compositions for tissue restoration
US2005025838

Abstract --- The invention provides a composition conditioned for the remodeling, restoration, repair, or replacement of tissue within a host. The composition is conditioned by culturing cells on the matrix and/or by exposing the cultured cells or matrix to one or more stressors.

Gastric submucosal tissue as a novel diagnostic tool
US2004157283

Abstract --- A cell culture growth substrate comprising submucosal tissue of a warm-blooded vertebrate and a method for culturing fastidious organisms is described. Submucosal tissue used in

accordance with the present invention supports the proliferation of cells when said cells are contacted with submucosal tissue under conditions conducive to cell proliferation.

Biomaterial derived from vertebrate liver tissue
US2004157323

Abstract --- A tissue graft composition comprising liver basement membrane is described. The graft composition can be implanted to replace or induce the repair of damaged or diseased tissues.

Method for repair of liver tissue
US2004187877

Abstract --- A method for inducing the repair of damaged or diseased liver tissue in vivo is provided. The method comprises the step of administering to the patient a graft composition comprising basement membrane tissue of a warm-blooded vertebrate in an amount effective to induce the repair of the liver tissue at the site of administration of the graft composition.

Method for repair of body wall
US2004191226

Abstract --- A method for inducing the repair of damaged or diseased body wall tissues is provided. In one embodiment, damaged or diseased body wall tissue is replaced with basement membranes of a warm-blooded vertebrate to promote regrowth of body wall tissues to form a multilaminate structure.

Composition and method for production of transformed cells
US2005003537

Abstract ---A composition useful for the production of transformed eukaryotic cells is described. The composition comprises submucosal tissue and a nucleic acid sequence. The nucleic acid sequence is typically recombinant DNA including gene(s) encoding for one or more biofunctional proteins. The submucosal tissue component of the present composition comprises the tunica submucosa of vertebrate intestine delaminated from the tunica muscularis and at least the luminal portion of the tunica mucosa. Injection or implantation of the composition into a host induces the formation of transformed cells capable of expressing gene(s) encoded by the nucleic acid sequence.

Vascularization enhanced graft constructs
US2004006395

Abstract --- A tissue graft construct for use in repairing diseased or damaged tissues is provided. The tissue graft construct comprises a matrix composition selected from the group consisting of urinary bladder submucosa and stomach submucosa, and extracts and hydrolysates thereof, added endothelial cells, and at least one additional preselected, exogenous population of cells which enhance initiation of the formation vessel-like structures in the graft construct. The preselected population of cells can be a population of non-keratinized or keratinized epithelial cells or a population of mesodermally-derived cells selected from the group consisting of fibroblasts, smooth muscle cells, skeletal muscle cells, cardiac muscle cells, multi-potential progenitor cells, pericytes, osteogenic cells, and any other suitable cell type, preferably selected based on the tissue to be repaired. Methods for enhancing the vascularization in vivo of these tissue graft constructs and for preparing these graft constructs are also provided.

Vascularization enhanced graft constructs
US2003216812

Abstract --- A tissue graft construct for use in repairing diseased or damaged tissues is provided. The tissue graft construct comprises a matrix composition selected from the group consisting of liver basement membrane and extracts and hydrolysates thereof, and processed collagen from

vertebrate non-submucosal sources, added endothelial cells, and at least one additional preselected, exogenous population of cells which enhance the initiation of vessel-like structures in the grant. The preselected population of cells can be a population of non-keratinized or keratinized epithelial cells or a population of mesodermally derived cells selected from the group consisting of fibroblasts, smooth muscle cells, skeletal muscle cells, cardiac muscle cells, multi-potential progenitor cells, pericytes, osteogenic cells, and any other suitable cell type, preferably selected based on the tissue to be repaired. Methods for enhancing the vascularization in vivo of these tissue graft constructs and for preparing these graft constructs are also provided.

Vascularization enhanced graft constructs
US2003216811

Abstract --- An intestinal submucosa tissue graft construct for use in repairing diseased or damaged tissues is provided. The graft construct comprises vertebrate intestinal submucosa tissue, added endothelial cells, and at least one additional preselected, exogenous population of cells which enhances initiation of the formation of vessel-like structures in the graft. The preselected population of cells can be a population of non-keratinized or keratinized epithelial cells or a population of mesodermally derived cells selected from the group consisting of fibroblasts, smooth muscle cells, skeletal muscle cells, cardiac muscle cells, multi-potential progenitor cells, pericytes, osteogenic cells, and any other suitable cell type, preferably selected based on the tissue to be repaired. Methods for enhancing the vascularization in vivo of these intestinal submucosa tissue graft constructs and for preparing these graft constructs are also provided.

VASCULARIZATION ENHANCED GRAFT CONSTRUCTS
WO03092604

Abstract --- A tissue graft construct for use in repairing diseased or damaged tissues is provided. The tissue graft construct comprises a matrix composition selected from the group consisting of liver basement membrane and extracts and hydrolysates thereof, and processed collagen from vertebrate non-submucosal sources, added endothelial cells, and at least one additional preselected, exogenous population of cells which enhance the initiation of vessel-like structures in the grant.. The preselected population of cells can be a population of non-keratinized or keratinized epithelial cells or a population of mesodermally derived cells selected from the group consisting of fibroblasts, smooth muscle cells, skeletal muscle cells, cardiac muscle cells, multi-potential progenitor cells, pericytes, osteogenic cells, and any other suitable cell type, preferably selected based on the tissue to be repaired. Methods for enhancing the vascularization in vivo of these tissue graft constructs and for preparing these graft constructs are also provided.

COMPOSITION AND METHOD FOR INHIBITING HYPERSENSITIVITY
WO03059284

Abstract --- The present invention is directed to methods, compositions, and devices for preventing or inhibiting undesired sensitization reactions of the skin or mucosa caused by a component of a transdermal or transmucosal drug delivery system. A method is provided wherein a matrix composition is administered to intact skin or mucosa of a vertebrate in combination with a transdermal or transmucosal drug delivery system to inhibit sensitization of the skin or mucosa by a component of the delivery system. The invention is also directed to a pharmaceutical composition comprising the transdermal or transmucosal drug delivery system, a therapeutically effective amount of a drug, and a therapeutically effective amount of a sensitization inhibitory composition comprising a matrix composition, and to a delivery device for administration of such a composition.

COMPOSITION AND METHOD FOR INHIBITING HYPERSENSITIVITY
WO03059221

Abstract --- The present invention is directed to methods, compositions, and devices for preventing or inhibiting undesired sensitization reactions of the skin or mucosa caused by a component of a

transdermal or transmucosal drug delivery system. A method is provided wherein an intestinal submucosa composition is administered to intact skin or mucosa of a vertebrate in combination with a transdermal or transmucosal drug delivery system to inhibit sensitization of the skin or mucosa by a component of the delivery system. The invention is also directed to a pharmaceutical composition comprising the transdermal or transmucosal drug delivery system, a therapeutically effective amount of a drug, and a therapeutically effective amount of a sensitization inhibitory composition comprising an intestinal submucosa composition, and to a device for administering such a composition.

BIOMATERIAL DERIVED FROM VERTEBRATE LIVER TISSUE
WO03059061

Abstract --- A tissue graft composition comprising liver basement membrane and a method of preparation of this tissue graft composition are described. The graft composition can be implanted to replace or induce the repair of damaged or diseased tissues.

Reduction of stent thrombogenicity
US2003065379

Abstract --- A tissue graft construct and method for repairing the inner linings of damaged or diseased vertebrate vessels is described. The method comprises the steps of positioning a tissue graft construct within a blood vessel at a site in need of repair. The tissue graft construct comprises a stent (3) covered with submucosal tissue (4) wherein the stent (3) is formed for receiving the distal end of a catheter (1) having an inflatable balloon (2).

Enhanced submucosal tissue graft constructs
US7175841

Abstract --- An improved tissue graft construct comprising submucosa of a warm-blooded vertebrate and a preselected group of eukaryotic cells are described. The improved tissue graft constructs can be used in accordance with the present invention to enhance the repair of damaged or diseased tissues in vivo.

Tissue regenerative composition
US2004043006

Abstract --- A matrix, including epithelial basement membrane, for inducing repair of mammalian tissue defects and in vitro cell propagation derived from epithelial tissues of a warm-blooded vertebrate.

Biomaterial derived from vertebrate liver tissue
US6793939

Abstract --- A tissue graft composition comprising liver basement membrane is described. The graft composition can be implanted to replace or induce the repair of damaged or diseased tissues.

Purified submucosa graft material
US2004078076

Abstract --- A graft prostheses (11), materials and method for implanting, transplanting, replacing, or repairing a part of a patient. The graft prosthesis includes a purified, collagen-based matrix structure delaminaetd from a submucosa tissue source. The submucosa tissue source is purified to remove contaminants, thereby making the purified and delaminated structure biocompatible and suitable for grafting on and/or in a patient.

Gastric submucosal tissue as a novel diagnostic tool
US6696270

Abstract --- A cell culture growth substrate comprising submucosal tissue of a warm-blooded vertebrate and a method for culturing fastidious organisms is described. Submucosal tissue used in accordance with the present invention supports the proliferation of cells when said cells are contacted with submucosal tissue under conditions conducive to cell proliferation.

Method for vocal cord reconstruction
US6918396

Abstract --- A method for surgical repair of damaged or diseased head and neck tissues is described. In one aspect of the invention tissue graft constructs comprising vertebrate submucosa or vertebrate basement membrane materials are used to repair and promote growth of endogenous vocal cord tissue.

Artificial vascular valves
AU5181101

Tubular submucosal graft constructs
AU2816101
