

Research Campaign

Title of the Project -

Gene Edited Mammal Organs with CollagenIII Aerogel Foam Scaffold Slices in Micro-Gravity Layer by Layer Biofabrication Replacing Human Organs

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DUNS Unique Entity ID - 854516654, NCAGE Code - 4283Y

SAM Unique Entity ID - YGMMHVL8KMN5 Indian Passport-No. U3926243

NASA REFERENCES - Moon Surface Science Workshop - ulf.israelsson@jpl.nasa.gov

Fundamental Physics Cold Atoms - Thompson, Robert J (US

3320) <robert.j.thompson@jpl.nasa.gov>

Fundamental Physics - Decadal Plans -Carpenter, Bradley M. (HQ-

DP000) <bcarpenter@nasa.gov>

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I am an INTERNATIONAL PRIZES WINNING ARCHITECT INDUSTRIAL DESIGNER from INDIA, Degrees B. Arch Architecture, Nagpur, 1975, Post Grad Diploma INDUSTRIAL DESIGN, IITBombay, 1977, Masters Building Science Technology, IITRoorkee University, 1983

2021-2025 UNDP Rosters- Environment, Energy, Climate Change Disaster Management

2021Aug PRESENTATION LUNAR BASE Spaceport NASA,

2021 NASA USDepEnergy RFI Quantum Physics, Astrophysics- Brad Carpenter, NASA

2020 International Space Station Workshops on BioFabrication 3DPrinting Tissue Engg

2018-2020 RENEWABLES SOLAR ENERGY – MASTERPLANNED 750 MW 3600

ACRES SOLAR FARM for L&T-S&L, Rajasthan INDIA

2014 UNDP-GEF Project Prevention of Saline Water Encroachment with Dykes,

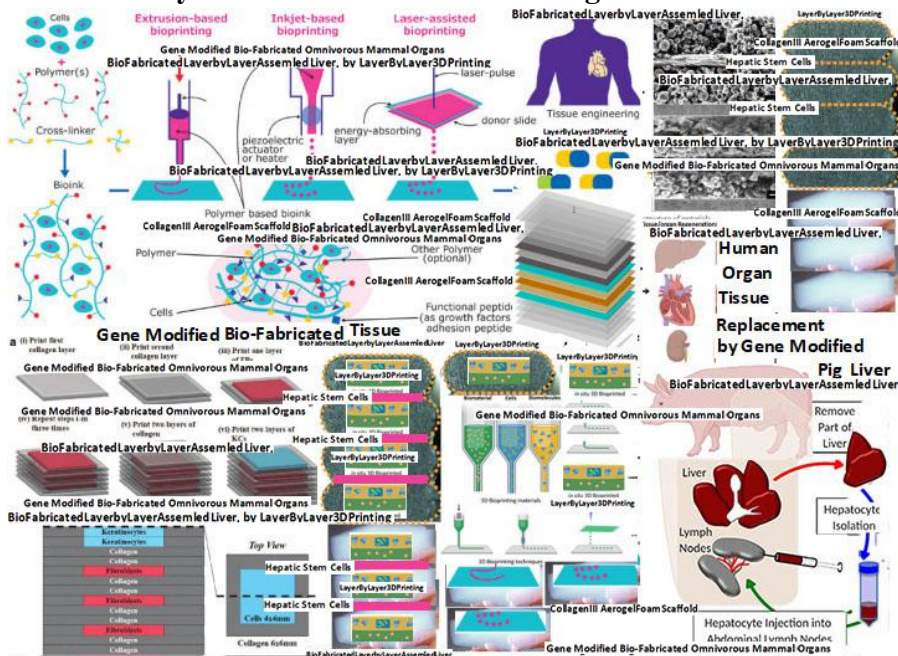
MULTIUSE AGRICULTURE, Rice Poultry, Duck Farming, Fish Farming with RAIN

HARVESTING SOLAR PUMPING IRRIGATION, GAMBIA, AFRICA

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Gene Edited Mammal Organs with CollagenIIIAerogelFoamScaffold Slices in
Micro-Gravity LayerbyLayer Biofabrication Replacing Human Organs.**

Human Organ Replacement by Gene Modified Bio-Fabricated Omnivorous Mammal Organs like BioFabricatedLayerbyLayerAssembledLiver, by LayerByLayer3DPrinting Guided Swine Liver Gene Modified Tissue, by Regeneration-on-CollagenIII AerogelFoamScaffold MicronThick Slices in Micro-Gravity with Human like Omnivorous Mammalian Liver like a Swine or Monkey to avoid Ethical Issues, and as Human Cadavers for Liver Donation have limited availability, with Gene Modifications of the Hepatic Tissue of for Creating 3DPrintedLiver to make Liver sufficiently acceptable for Human Liver Replacement. Micro-gravity, ensures No-Collapse of CollagenIIIAerogelScaffolds layers with Tissue Stem Cells, when CollagenIIITissueStemCellLayers are combined as a Bulk Organ.

Gene Modification of Liver Tissue in a Living Swine - Pig as a Slaughter Animal, before Extraction for Using the Gene Modified Swine Pig Liver Tissue for 3 D Printing Human Liver may sort out many ethical Issues and make Industrial Scale 3DPrinting Human Tissue a Feasible outcome with Slaughterhouse Marked Gene Modified Swine Pig Liver Tissue. Micro-gravity, ensures No-Collapse of CollagenIIIAerogelScaffolds layers with Tissue Stem Cells, when CollagenIII Tissue StemCell Layers are combined as Bulk Organ.



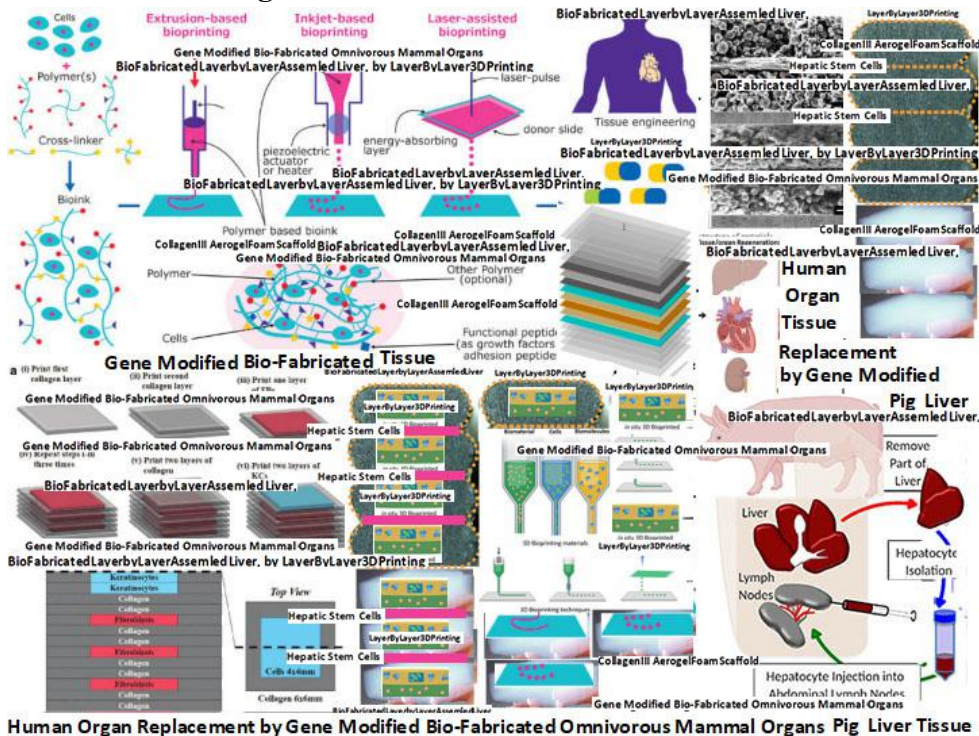
Human Organ Replacement by Gene Modified Bio-Fabricated Omnivorous Mammal Organs Pig Liver Tissue

The liver is the only human internal organ capable of natural **regeneration of lost **tissue** from as little as 25% of a liver inSitu Vivo to regenerate into a functional**

compensatory liver. However Liver Regeneration in Vitro Lab Set-up has failed. Microgravity has the potential to create liver inSitu Vivo like 3D-CollagenIII Support with Dendritic-Liver-Hepatic-Tissue, Pre-Sealed-3DPrinted on Micron Thin Slices of CollagenIII AerogelFoamSheets which can be Assembled in Microgravity with complimentary Male-Female matching AerogelFoamSheets Floating in Space Reverse Dendritic Support with Blood Network with Stem Cells and Hepatic Cells. Liver composite 3DPrint-Guided Regeneration with CollagenIII AerogelFoamScaffold in Micro-Gravity with Omnivorous Mammal Liver Swine or Monkey, with Gene Modifications to make the Liver acceptable for Human Liver Replacement. Aerogel FoamSheets will not collapse in Microgravity.

Foetal liver contains bipotential hepatoblasts capable of differentiating into hepatocytes and cholangiocytes. These cells are capable of self-renewal after loss, but when hepatocyte renewal is compromised, bipotential oval cells are activated from the canal of Hering cells (potential stem cell niche) to take over the burden of regenerative growth. The bone marrow also harbours cells with liver potential. It is better to Use Gene Modifiers before Growing a 3DPrinted Gene Modified Swine Liver for Human Liver Replacement.

Gene Modification of Liver Tissue in a Living Swine - Pig as a Slaughter Animal, before Extraction for Using Gene Modified Swine Pig Liver Tissue for 3 D Printing Human Liver may sort out many ethical Issues and make Industrial Scale 3DPrinting Human Tissue a Feasible outcome with Slaughterhouse Marked Gene Modified Swine Pig Liver Tissue.



However, the Liver Regenerates as a **compensatory growth** in mammals, the lobes that are removed do not regrow and the growth of the liver is a restoration of function, not original form. Liver Regenerates as a **compensatory growth**, of the liver as a restoration of function and happens predominantly due to the **hepatocytes** re-entering the **cell cycle**.

If this is the case, it may be more useful to genetically Alter the Starting Material or Hepatocytes or Hepatic Stem Cells, because the after the Cell Cycle too many Genetic Linkages may need Effective Modification.

Restoration of Hepatic functions happens predominantly due to the **hepatocytes** re-entering the **cell cycle**, the hepatocytes go from the quiescent **G0 phase** to the **G1 phase** and undergo mitosis. This process is activated by the **p75** receptors. There is also some evidence of **bipotential stem cells**, called hepatic oval cells or ovalocytes, which are thought to reside in the **canals of Hering**. These cells can differentiate into **hepatocytes** or **cholangiocytes**. Cholangiocytes are the **epithelial lining cells** of the **bile ducts**. They are cuboidal epithelium in the small interlobular bile ducts, but become columnar and mucus secreting in larger bile ducts approaching the porta hepatis and the extrahepatic ducts. Research is being carried out on the use of stem cells for the generation of an **artificial liver**.

One of the Ways of Generation of Artificial Liver is to Use a Human Liver like Omnivorous Mammal, performing similar Hepatic Functions as for a Mainly Vegetarian Food Grain and Leaf Eater with a Substantial Non-Vegetarian or Flesh Food Intake like Humans. Such Mammals are many, including Humans, Apes, Monkeys, Dogs, Swines or Pigs. Swines or Pigs Liver are Pork related Slaughter House Animals and so have minimal Ethical Killing Issues if they are already marked for the Slaughter House.

Gene Modification of Swine Liver Tissue to a Human Liver like Tissue in a Living Swine - Swine or Pig as a Slaughter Animal for Pork, and therefore Gene Modification of Swine Liver Tissue to a Human Liver like Tissue in a Living Swine before Extraction for Using the Gene Modified Swine Pig Liver Tissue for 3 D Printing Human Liver may not be an Ethical Issues if the Genetically Modified Swine is Quickly Euthanized after Removal of All Genetically Modified Swine Organs like Liver, Kidneys, Heart, Lungs, Eyes, Bone Marrow and Skin which can be Used for Replacing Human Organs. Genetically Suitably Altered Swine Tissue to make it sufficiently Acceptable as a Human Organ Tissue Replacement will make Industrial Scale 3DPrinting Human Tissue in a Satellite of Space Station in Micro-gravity a Potentially Economically Feasible and Profitable Outcome for Sustaining Space Research and Enhance Human Health related Diseased or Damaged Human Organ Replacement with Slaughterhouse Marked Gene Modified Swine Pig Liver, Extrapolated to Other Human Organ Tissues Replacement with Gene Modified Swine Pig Tissue Organs.

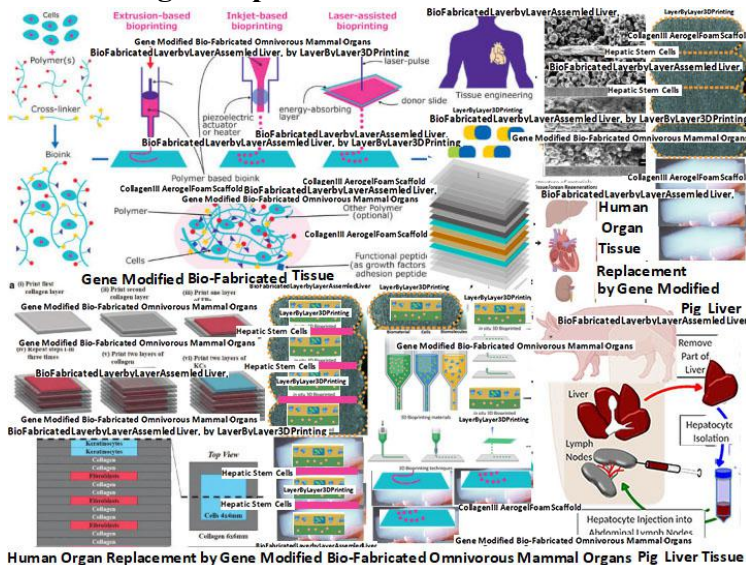
Liver Sealed Layer of CollagenIII with 2DPrinted Gene Modified Swine Pig Liver Tissue for 3 D Printing Human Liver by CollagenIII Layer with Hepatic Stem Cells,

bipotential oval cells are activated from the canal of Hering cells and Stem Cells Packing Gene Modified Swine Pig Liver Tissue for 3 D Printing Human Liver. Other Swine Organs can be Human 3D Assembled. Micro-gravity, ensures No-Collapse of CollagenIIIAerogelScaffolds layers with Tissue Stem Cells, when CollagenIII Tissue StemCell Layers are combined as Bulk Organ.

Foetal liver contains bipotential hepatoblasts capable of differentiating into hepatocytes and cholangiocytes. These cells are capable of self-renewal after loss, but when hepatocyte renewal is compromised, bipotential oval cells are activated from the canal of Hering cells (potential stem cell niche) to take over the burden of regenerative growth. The bone marrow also harbours cells with liver potential

Liver Regeneration in Vitro Lab Set-up has failed. Microgravity has the potential to create liver inSitu Vivo like 3D-CollagenIII Support with Dendritic-Liver-Hepatic-Tissue, Pre-Sealed-3DPrinted on Micron Thin Slices of CollagenIII AerogelFoamSheets which can be Assembled in Microgravity with complimentary Male-Female matching AerogelFoamSheets Floating in Space Reverse Dendritic Support with Blood Network with Stem Cells and Hepatic Cells. Liver composite 3DPrint-Guided Regeneration with CollagenIII AerogelFoamScaffold in Micro-Gravity with Omnivorous Mammalian Liver Swine or Monkey, with Gene Modifications to make the Liver acceptable for Human Liver Replacement.

CollagenII Aerogel Foam Sheets will not collapse in Microgravity. Liver-composite-LayerByLayer3DPrinting Guided-Regeneration-CollagenIII based Assembly. AerogelFoamScaffold MicronThick Slices in Micro-Gravity. Layer by Layer Organized Liver Assembly in Microgravity for Regeneration as Human Tissue as CollagenII Aerogel Foam Sheets will not collapse in Microgravity. Other Swine Organs like Liver, Kidney, Heart, Lungs, Eyes, can be Genetically Modified and Used as Layered Assembled Artificial Human Organs for Damaged or Diseased Human Organ Replacement.



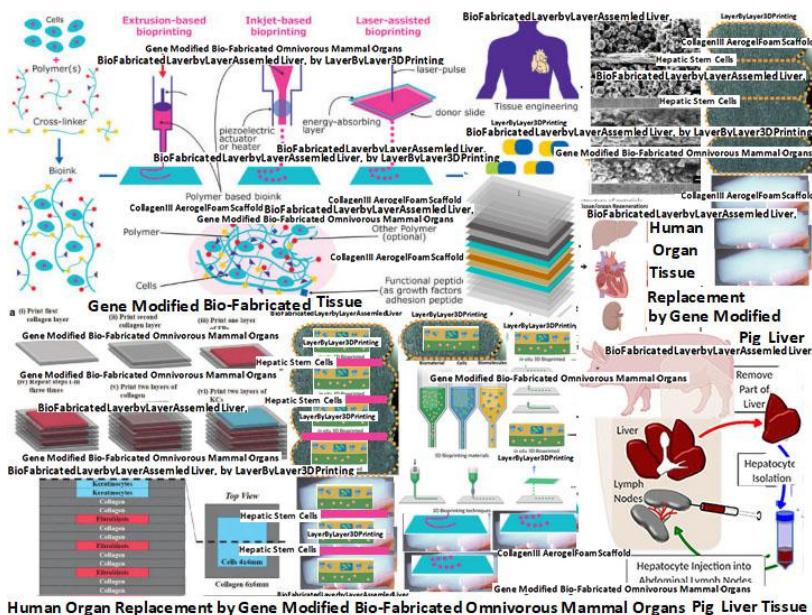
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**AerogelFoamScaffold MicronThick Slices in Micro-Gravity,
LayerByLayer3DPrinting Guided-Regeneration-CollagenIII based Assembly, of an
already Existing Swine Organ ensures guaranteed Reorganization, easy because of
Spatial Aerogel Matrix Guided by an Already Existing Functional Structure of a
Mammal Organ, similar to a Human Organ.**

**In-Between-Layer of Human Stem Cells or Bone Marrow or other potential stem
cells in AerogelFoamScaffold MicronThick Slices in Micro-Gravity, with necessary
Biochemicals, Enzymes, Signalling Biochemicals ensure quick Healing Regrowth to
a Genuine Human Functional Organ Tissue and ensures better Healing
Reorganization, easy because of Spatial Aerogel Matrix Guided an Already Existing
Functional Structure of a Mammal Organ, similar to a Human Organ..**

**CollagenIIIAerogelFoamScaffold MicronThick Slices in Micro-Gravity. Layer by
Layer Organized Liver Assembly in Microgravity for Regeneration as Human
Tissue as CollagenII Aerogel Foam Sheets will not collapse in Microgravity.**

**Other Swine Organs like Liver, Kidney, Heart, Lungs, Eyes, can be Genetically
Modified and Used as Layered Assembled Artificial Human Organs for Damaged or
Diseased Human Organ Replacement, with Layer by Layer Microgravity
Biofabrication of Organs.**



Human Organ Replacement by Gene Modified Bio-Fabricated Omnivorous Mammalian Organs Pig Liver Tissue