

# A Scientific Overview of Hybrid Bio Chemicals in Various Artificial Organs

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## ***Abstract-***

Such Elements assume the significant job in every single living being. For the most part these mixes are liable for the indispensable activities of a living being, for example, enzymatic activities, breath, photosynthesis, metal particle transport and so on. In late time various bioinorganic materials have been integrated mostly or totally in the labs. These engineered bioinorganic materials fill in as clinical help for humankind as they are the key for advancement of counterfeit tissues and organs. In this paper we are examining about counterfeit organs and related bioinorganic materials.

***Keywords:*** *Artificial organs, bioinorganic materials, polymers etc.*

## **I. INTRODUCTION**

The natural and inorganic materials of a living being make a substitute side of material world. Organic materials, for instance, polysaccharides, proteins, nucleic acids and lipids have sensitive and adaptable nature. They show colossal limits with high capability and distinction. In the mix with manufactured or man-made materials these materials can't be recovered or reproduced without any problem. The above properties of natural materials accept the prime occupation in the improvement of significantly present day pragmatic systems. The best way to deal with gain significantly consistent and utilitarian bio materials for their convenient applications is to make cross types of inorganic and trademark common materials. The organically begun materials are effective and hold various significant nanostructures.

Consequently the most entrancing methodology in the advancement of an engineered bio polymer is the hybridization of inorganic and biological components in a controlled way. The synthesis of artificial bio materials is an interdisciplinary field which interfaces biotechnology, material science and nanotechnology. Other processes like biomineralization, synthesis and development of bio-inspired materials and biomimetic systems are patrilineal to the synthetic

artificial bio materials. The recent developments of novel bio nano-composites with multi-functionalities lead us to the next generation in this field.

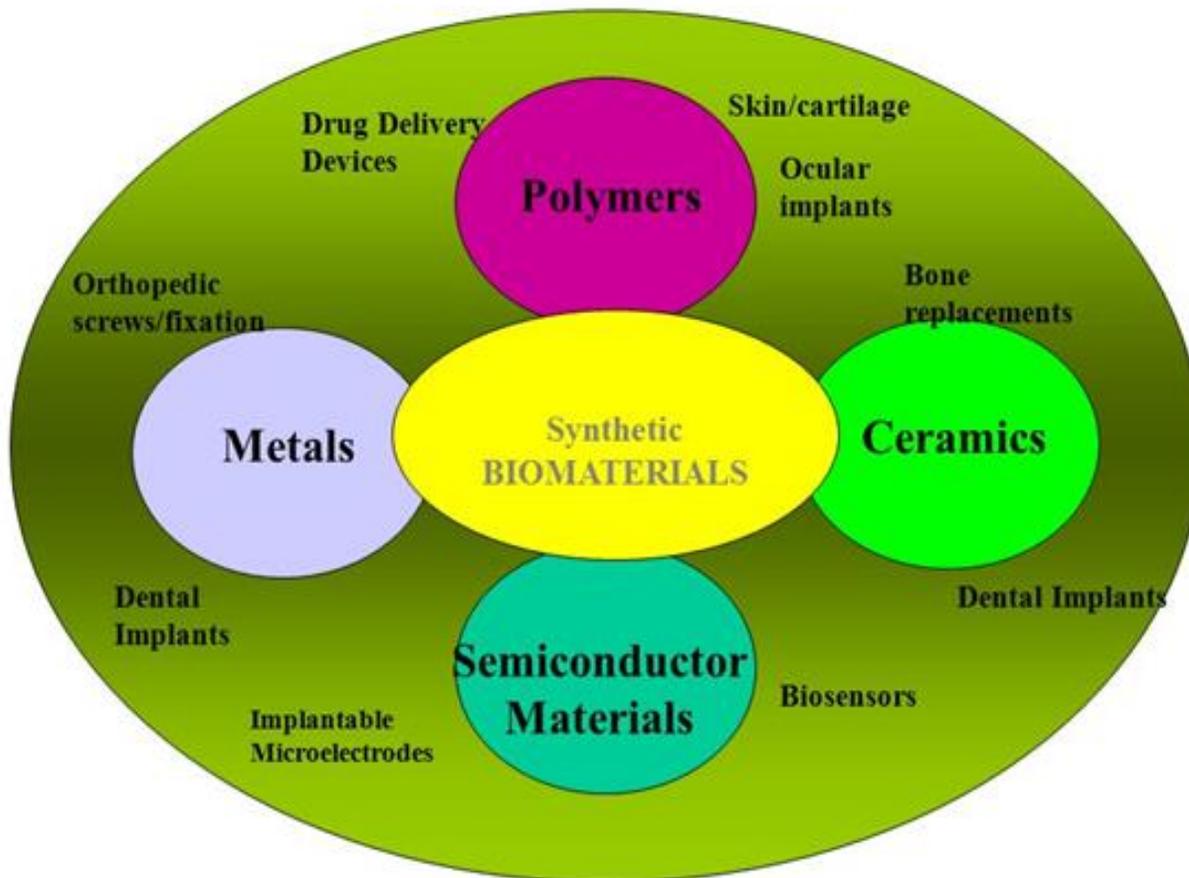


Fig 1: Synthetic Biomaterial

## II. ARTIFICIAL BIO MATERIALS

Artificial organs are generally defined as any device, machine or complex biological structure which is partially or completely synthetic in nature and that could be implanted or integrated into human body to perform the tasks of a particular biological structure <sup>which</sup> has been damaged and should be replaced due to some medical reasons. The scientists are continuously working to procure newer, safer and cheaper pathways to fabricate artificial organs which could curtail the time for organ transplant and transform the surgery. A brief description of sundry artificial organs is as follows:

**Artificial Bone:-** it is a bone like synthetic material which is used as bone grafts in order to replace the human bones that was lost because of disease or severe fractures. The mutilated bone

can be replaced by autografts (bone from the other parts of the body), allografts (bone from cadavers), megagrafts (various bioceramics), callografts (hydroxyapatite/tricalcium phosphate and bovine collagen) and metallic alloys.

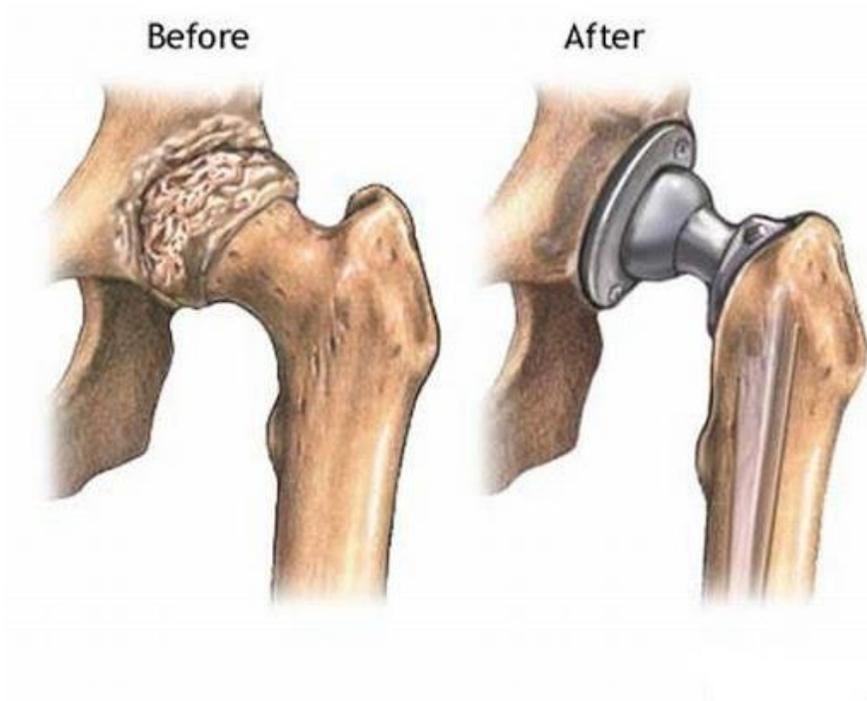


Fig 2: artificial Bones

**Artificial Kidney:-** Commonly it is mechanical device which cleans the patient blood who is suffering from severe renal diseases or kidney failure. It removes waste products, excess water and salts from human body. Implantable artificial kidney is a bio hybrid device which imitates the function of a healthy kidney. Wearable artificial kidney is a wearable dialysis machine that can be used continuously or daily basis. Various polymers, copolymers, hollow fibers and silicon nanotechnology have been used to fabricate artificial kidney.

### SMART KIDNEY

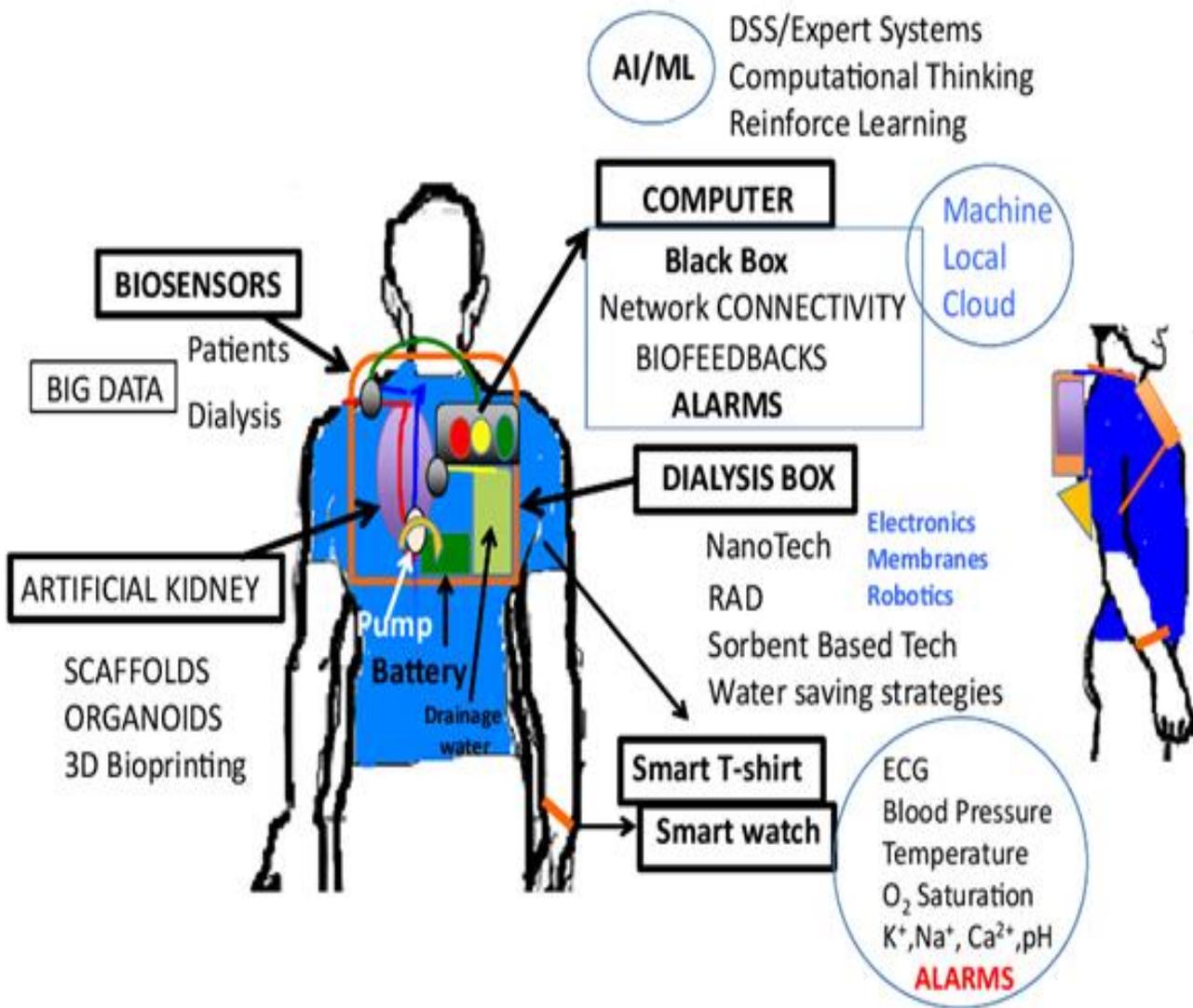
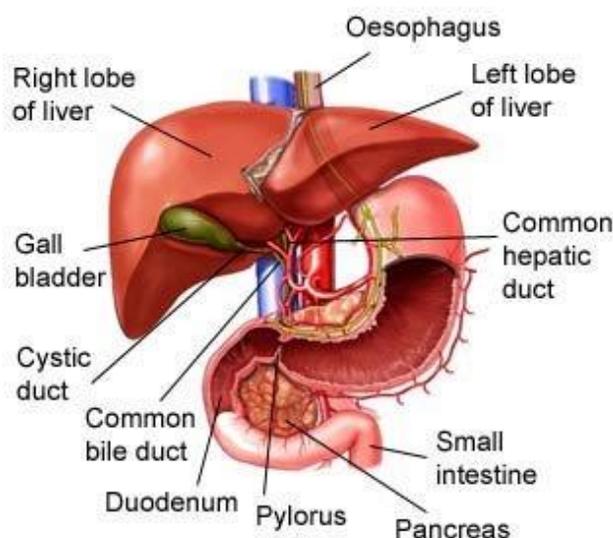


Fig 3: artificial kidney

**Artificial Liver:-** it is a supportive device which either gives time to liver for regeneration or bridges the patient's liver functions till transplantation. Generally bio artificial livers are bioreactors that are embedded with hepatocytes and these hepatocytes perform normal functions of liver. BAL includes hollow fiber cartridge and the suspension of hepatocytes in gel solution like collagen is injected to hollow fiber matrix. Flat membrane sheet systems are also being developed.



**Fig 4: Artificial Liver**

### III. CONCLUSION

In this paper we have examined about fake biomaterial. Fake bio materials are altogether significant in the improvement of fake organs. Different fake organs like bone, heart, kidney, liver, lung, pancreas, skin, urinary bladder, sound-related brainstem embed, bionic contact focal point, cochlear embed, direct acoustic cochlear embed, retinal embed and visual prosthetic parts have been created.

### REFERENCES

- [1] Ross D. Farhadieh, Neil W. Bulstrode & Sabrina Cugno, Plastic & Reconstructive Surgery: Approaches & Techniques, Wiley, 2015.
- [2] Charles G. Gebelein, Polymeric Materials & Artificial organs, ACS Symposium Series, 1984.
- [3] Joyce Y. Wong, Joseph D. Bronzino & Donald R. Peterson, Biomaterials: Principals & Practice, CRC Press, 2013.
- [4] Denise Brehm, Printing Artificial bone, MIT News, June 2013.
- [5] Junzo Tanaka & Toshiyuki Ikoma, Artificial bones for faster bone regeneration, Oct. 2014.
- [6] Rayan R. Joshi, Artificial Heart Research: An Historical Perspective, DASH, 2001.
- [7] Anthony Atala, Stuart B. Bauer, Shay Soker, James J. Yoo, Alan B. Retik, The Lancet, 367(9518), 2006, 1241-1246.
- [8] Rebecca Zumoff, Implantable Artificial Kidney Project Making Progress, Nephrology News & Issues, Feb 2016.
- [9] Catharine Paddock, Implantable Artificial Kidney based on Microchips sees major progress, Feb 2016.
- [10] Gesine Pless, Artificial and Bio-artificial Liver Support, Organogenesis, 3(1), 2007, 20-24.

- [11] Palakkan, A. A., Hay, D. C., PR, A. K., TV, K. and Ross, J. A., Liver tissue engineering and cell sources: issues and challenges, *Liver International*, 33(5), 2013, 666-76.
- [12] Heather Nolan, Dongfang Wang & Joseph B Zwischenberger, *Artificial Lung Basics, Organogenesis*, 7(1), 2011, 23-27.
- [13] William J. Federspiel & Robert G. Svitek, *Lung, Artificial: Current Research and Future Direction, Encyclopedia of Biomaterials and Biomedical Engineering*, 2004, 922-931.
- [14] Claudio Cobelli, Eric Renard and Boris Kovatchev, *Artificial Pancreas: Past, Present, Future, Diabetes*, 60(11), 2011, 2672-2682.