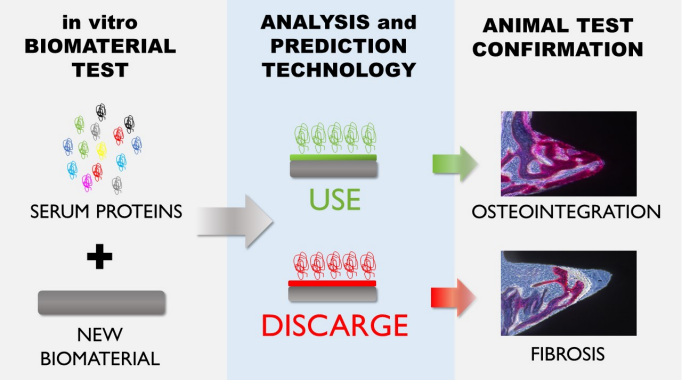
Predictive technology for biocompatibility of biomaterials

Background
Biomaterials have been used for several applications (dental implants, joint replacements, bone plates, blood vessel prostheses, heart valves, artificial tissue, contact lenses, and breast implants). Biomaterials commonly used are polymers (synthetic and natural), ceramics, and metals. Each biomaterial has specific chemical composition, mechanical characteristics, processing methods, chemical properties and specific cell-material interactions. The design of novel, inexpensive, biocompatible materials is crucial to the improvement of the living conditions.
Current Options. New biomaterials undergo testing of biocompatibility before being used for clinical use. To date, testing comprise cellular adherence tests and in vivo test on animal models, which may require much time and have high costs, and may not be suitable for personalized implants.

Unmet Technological Need
Biomaterial engineering companies produce new materials that need to be tested for biocompatibility before scale up production. The evolution of 3D printing for personalized replacement is severely limited by printable materials, especially for the production of implantable biomedical devices. Companies need new materials processing methods to work with materials that are not easily printed. In addition, existing in vitro tests for biocompatibility of materials have low specificity and sensitivity which oblige biomaterial producers to confirm results in animals (e.g. formation of fibrotic capsule). Thus, it is necessary that the processes employed for biomaterials production and biocompatible selection are affordable, fast, and simple to carry out.

Technology
The technology is a fast and cheap in vitro test to predict the biocompatibility of material to be used in implants. Is based on a specific protein profile comparison to discriminate bioreactive material versus bioactive material. It can carry out relatively fast (hours) and in not stringent sterile conditions.



Application
- Test of new biomaterials in R&D stage.
- Test of new material to be used in small-scale testing (3D printing materials).
- Personalized material design and prosthetic applications.

Advantages
- Fast selection and screening of many biocompatible materials with the same patient serum sample.
- Cheap method with reduced need of cellular and animal testing.
- Reduce use of cellular or animal studies for biocompatibility testing.

Patent Status.
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