Technology Offer by

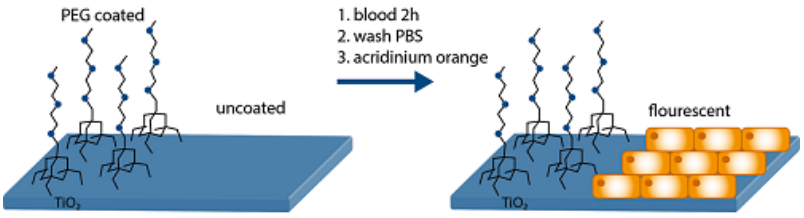
Hessische Intellectual Property Organisation

Functional surface modification inspired by the mussel adhesive protein- the most stable adhesive in nature

Antibacterial Surface coating; lotus effect, catechol derivatives

DESCRIPTION OF TECHNOLOGY / PRODUCT

Durable and stable surface coatings can be achieved on medically relevant metals (e.g.,titanium) and directly on bones and teeth.
The coating can be used for various functionalizations and is easy to apply.
The surface to be modified is immersed in a liquid of synthetic compounds by a simple "dip & rinse" method. Different drug molecules such as PEG, antibiotics, enzymes and other biomolecules can be coupled to the natural molecule by a simple chemical reaction ("click reaction").
The new tripodal ligands offer considerable advantages in comparison to the state of the art monovalent metal and bone binders currently used.



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The substances JR-BT-1, JR-BT-4 and ER-36 show a clearly inhibitory effect on titanium surfaces. Zwitterionic molecular constituents can impart a very hydrophilic character to the metal surface, so that hydrophobic substances (e.g., fats) are repelled.

AT A GLANCE …

TECHNOLOGY FIELD / SCOPE OF APPLICATION

Surface coating/ antibacterial surface coating/ lotus effect/ Chemical syntheses of trimeric catechol derivatives

MARKET / BRANCH

Chemical, pharmaceutical and medical technology, Hospital Hygiene

USP

- antibacterial effect
- high abrasion-resistance
- easy coating procedure
- low costs (ca. 25 € /2500 m^2)
- reclaimable
- highly defined surface loading with active components
- functionalisation of metal and glass surfaces
- dirt-repellent, lotus effect

DEVELOPMENT STATUS

✓ Synthesis well established
✓ Processes tested and validated

➢ Next steps: Validation concerning special industrial products

PATENT PORTFOLIO

Patents granted in US, GB DE, FR

REFERENCE NO.: TM 462 / 500

SCOPE OF APPLICATION

Possible fields of application for targeted surface modifications for use in medical devices, pharmaceutics and further technologies:

- dental implants
- joint prostheses
- metal tubes, wastewater pipes and further applications where grease deposits cause problems
- coating of door handles and bathroom fittings in health care facilities such as hospitals
- cannula for syringes, catheters and infusions
- stents
- biosensors
- ship hulks, Metal containers, Water tanks and pipelines
- eyeglass lenses

ADVANTAGES COMPARED TO STATE OF THE ART

- lotus effect with highly antibacterial effect
- only mechanical repellent effect to bacteria without using any reactive agent, that might penetrate the skin
- no use of antibiotic agent, overcoming the problem with multi- resistant pathogens in hospitals
- high abrasion resistance due to the biomimetic structural homology with the mussel adhesive protein
- no toxicity (tested in cell cultures with stem cells)
- low material costs (ca. 25 € for 2500 m²)
- easy coating with industrial standard procedures

DEVELOPMENT STATUS

Various possibilities of application result from the functionalization by charging with selectable active ingredients. The product appeals to companies in the field of metal coatings, glass coatings (optics industry) and in the production of medical technology (medical implants, stents, biosensors).
Applications with problematic grease deposits
(e.g., sewage pipes) can be solved by applying hydrophobic coatings.
The next step would be the verification of specific industrial products.

OFFER

On behalf of its shareholder Justus-Liebig-Universität Giessen, TransMIT GmbH is looking for cooperation partners or licensees for further development and industrial applications in Germany, Europe, US, and Japan.

A TECHNOLOGY OF

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

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