Non-Confidential Description - PSU No. 3144
“Sculptured Thin Films to Control Cellular Processes”

Keywords:
Nanotechnology, Thin Films, Biocompatible, Polymer

Links:
Inventor Website - 1
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Background
Controlling cellular proliferation, differentiation, and adhesion is essential for many biotech applications. One may presently achieve such control with sculptured thin films (STF’s) of microscale topography and these films can be functionalized to promote cellular processes. However, the materials comprising these films are frequently incompatible with cellular matter (e.g., silicon rapidly degrades when interacting with biofluids). An interesting alternative is polymeric STF’s of nanoscale topography, which do not necessarily need to be functionalized since their very topography alters cellular processes.

Invention Description
The disclosed invention entails polymeric STF’s of nanoscale topography. The films feature porous, three-dimensional textures at both the nanoscale and microscale thereby promoting cell adhesion, proliferation, and differentiation. They are made of biocompatible materials and are formed by physical and chemical vapor deposition – no masks are needed. One may coat the films in strips, sheets, or on prefabricated polymeric and inorganic parts.

Advantages/Applications
- Porous, three-dimensional textures
- Biocompatible, can be functionalized if needed
- Inexpensive, rapid fabrication
- Coatings of implants and prosthetics