

## SUPPLEMENTARY MATERIALS

### 1. Supplementary materials and methods

#### MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) analysis

0.5 mg/ml MTT reagent was added into the fresh DMEM medium for formazan development. DMSO was used to dissolve the formazan and the colored product was then transferred into a 96 well plate and placed in a microtitre plate reader. Optical density was read at 560 nm with a reference filter of 620 nm and normalized by the ratio of implant surface area to culture dish surface area for statistical analysis. Cytokine analysis of culture medium from cells grown on a glass cover slip was used as a positive control.

#### Energy dispersive X-ray (EDX) spectroscopy

To analyze the surface element composition, the material discs (n= 3 for both pH 6.5 ATF and pH 5 ATF) after long-term incubation were assessed using SEM combined with energy dispersive X-ray spectroscopy (SEM-EDX; JEOL 5600LV, Japan).

### 2. Supplementary results

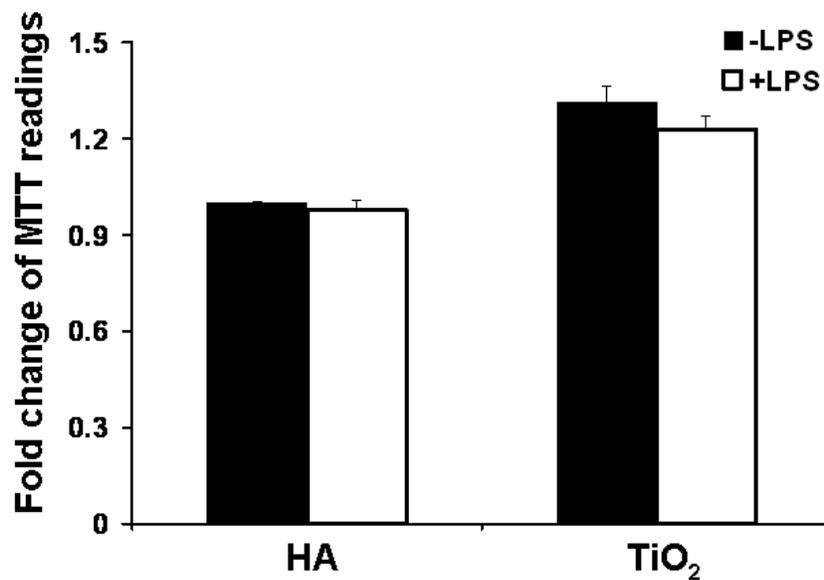
MTT assay indicated that LPS (10 ng/ml) has no significant effect on the cytotoxicity of corneal fibroblasts on both TiO<sub>2</sub> and HA ( $p < 0.05$ ,  $n = 6$ , Suppl. Fig.).

The material elemental compositions before and after the long-term degradation tests are listed in Supplementary table. Comparison data of the elemental composition shows that “Ca” and “P” were continuously released from HA during the incubation with artificial

tear fluid. However, there was no such elemental lost from  $\text{TiO}_2$  specimens. No significant change in the compositions of “Ti” and “O” elements before and after long-term incubation with artificial tear fluid was observed.

### 3. Supplementary Figure and Table

**Supplementary Figure:** Cell viability measured by MTT assay at 24 hours after LPS stimulation. The OD absorption readings of cells on glass slide (GS) without LPS treatment are arbitrarily defined as “1”.  $n=6$ .



**Supplementary Table:** Elemental composition in (wt.%) of HA and  $\text{TiO}_2$  before and after long-term corrosion test.  $n=3$ .

Matrix	Ca	P	C	O	Ti
HA (before degradation)	16.1±0.01	12.1±0.01	16.7±0.06	53.8±0.04	
HA (after 3 months, pH6.5 )	10.2±0.58	7.6±0.67	31.9±2.67	50.3±1.71	
HA (after 3 months, pH5 )	3.8±0.21	5.3±0.11	29.9±0.52	60.9±0.55	
Ti (before degradation)				71.5±0.01	28.0±0.26
Ti (after 3 months, pH6.5 )				72.8±0.64	27.2±0.53
Ti (after 3 months, pH5 )				71.7±1.16	28.3±0.96