

**Table S1.** Characterization data of the synthesized calcium phosphate nanoparticles<sup>1</sup>.

| Sample                                                                           | CaP<br>(CaP/PEI/SiO <sub>2</sub> -SH) | Env-CaP<br>(CaP/PEI/SiO <sub>2</sub> -Env) | Env-CaP-p30<br>(CaP/PEI/p30/SiO <sub>2</sub> -Env) | Env-CaP-CpG<br>(CaP/PEI/CpG/SiO <sub>2</sub> -Env) |
|----------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Solid core diameter by SEM /nm                                                   | 38                                    | 45                                         | 45                                                 | 57                                                 |
| <i>V</i> (one nanoparticle; only CaP)/m <sup>3</sup>                             | 2.85×10 <sup>-23</sup>                | 4.83×10 <sup>-23</sup>                     | 4.89×10 <sup>-23</sup>                             | 9.67×10 <sup>-23</sup>                             |
| <i>m</i> (one nanoparticle; only CaP)/kg                                         | 8.95×10 <sup>-20</sup>                | 1.52×10 <sup>-19</sup>                     | 1.54×10 <sup>-19</sup>                             | 3.04×10 <sup>-19</sup>                             |
| <i>w</i> (Ca <sup>2+</sup> ) by AAS/kg m <sup>-3</sup>                           | 0.068                                 | 0.026                                      | 0.032                                              | 0.023                                              |
| <i>w</i> (Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> OH)/kg m <sup>-3</sup> | 0.171                                 | 0.064                                      | 0.079                                              | 0.057                                              |
| <i>N</i> (nanoparticles)/m <sup>-3</sup>                                         | 1.91×10 <sup>18</sup>                 | 4.23×10 <sup>17</sup>                      | 5.14×10 <sup>17</sup>                              | 1.87×10 <sup>17</sup>                              |
| <i>w</i> (Env-Trimer)/kg m <sup>-3</sup><br>(85% UV-Vis Factor)                  | –                                     | 0.085                                      | 0.085                                              | 0.085                                              |
| <i>w</i> (Env-Trimer)/kg m <sup>-3</sup><br>(Nanodrop)                           | –                                     | 0.100                                      | 0.072                                              | 0.086                                              |
| <i>N</i> (Env-Trimer)/m <sup>-3</sup>                                            | –                                     | 3.66×10 <sup>20</sup>                      | 3.66×10 <sup>20</sup>                              | 3.66×10 <sup>20</sup>                              |
| <i>m</i> (Env-Trimer) per nanoparticle/kg                                        | –                                     | 2.01×10 <sup>-19</sup>                     | 1.65×10 <sup>-19</sup>                             | 4.54×10 <sup>-19</sup>                             |
| <i>N</i> (Env-Trimer) molecules per nanoparticle                                 | –                                     | 865                                        | 710                                                | 1950                                               |
| <i>N</i> (Env-Trimer) molecules per nanoparticle<br>(Nanodrop)                   | –                                     | 1020                                       | 600                                                | 1980                                               |
| weight ratio of Env-Trimer loading to calcium phosphate                          | –                                     | 1:1.3                                      | 1:1.1                                              | 1:1.5                                              |
| <i>w</i> (adjuvant)/kg m <sup>-3</sup>                                           | –                                     | –                                          | p30:0.068                                          | CpG: 0.040                                         |
| <i>N</i> (adjuvant)/m <sup>-3</sup>                                              | –                                     | –                                          | p30:1.65×10 <sup>22</sup>                          | CpG:3.79×10 <sup>21</sup>                          |
| <i>m</i> (adjuvant) per nanoparticle/kg                                          | –                                     | –                                          | p30:1.32×10 <sup>-19</sup>                         | CpG:2.14×10 <sup>-19</sup>                         |
| <i>N</i> (adjuvant) molecules per nanoparticle                                   | –                                     | –                                          | p30:3.2×10 <sup>4</sup>                            | CpG:2.0×10 <sup>4</sup>                            |
| Hydrodynamic diameter by DLS/nm (z-average)                                      | 312                                   | 411                                        | 386                                                | 362                                                |
| Hydrodynamic diameter by DLS/nm (by number)                                      | 123                                   | 33                                         | 35                                                 | 73                                                 |
| PDI by DLS                                                                       | 0.31                                  | 0.43                                       | 0.41                                               | 0.38                                               |
| Zeta potential by DLS/mV                                                         | +27                                   | +20                                        | +23                                                | +27                                                |
| Endotoxins/EU mL <sup>-1</sup>                                                   | <0.1                                  | <0.1                                       | <0.1                                               | <0.1                                               |

<sup>1</sup>The given concentrations refer to the nanoparticle stock solutions which were then diluted and applied in the biological experiments. The estimation of the particle number concentration was based on a number of assumptions (see Materials and Methods). PDI: Polydispersity index from DLS.