Supplementary Figure 1. Dynamic light scattering of OspA-ferritin nanoparticles

Dynamic light scattering profile of OspA-ferritin nanoparticles. Radius was 13 nm, 7.4% polydispersity and mass was 100%.
Supplementary Figure 2. Binding of LA-2 antibody to OspA-ferritin nanoparticles.

ELISA coated with either OspA-ferritin or Recombitek. Purified mouse LA-2 antibody was added in a dilution series to determine antibody binding.
Supplementary Figure 3. Immunogenicity and duration of the Ab response induced by serotype 1 OspA-ferritin nanoparticles compared to Recombitek™.

C3H mice (n=5) were immunized intramuscularly with the molar equivalent of 1 µg of the OspA-ferritin + Ribi adjuvant or Recombitek™ at week 0 and week 4. ELISA titers were measured 21 wks after 2nd immunization (week 25) of each vaccine.
Supplementary Figure 4. Homology of LFA-1 to OspA serotypes

Phylogenetic tree showing the homology of OspA serotypes to human LFA-1 aa 326-173. The putative LFA-1 homology site in OspA serotype 1 is at aa165-173.
Supplementary Figure 5. Generation of alternative serotype OspA nanoparticles in \textit{E. coli}. 

| Serotype | Strain                  |
|----------|-------------------------|
| 1        | \textit{Borrelia burgdorferi} B31 |
| 2        | \textit{Borrelia afzelii} Pko                    |
| 3        | \textit{Borrelia garinii} PBr                        |
| 4        | \textit{Borrelia bavariensis} Pbi                |
| 5        | \textit{Borrelia garinii} Phei                        |
| 7        | \textit{Borrelia garinii} T25                        |

Biochemical analysis by SDS-PAGE of OspA-ferritin serotypes 1-5, and 7 purified by size exclusion chromatography.
Supplementary Figure 6. Body weight changes in mice after vaccination.

The % body weight change was calculated from the weight of the mouse at the first vaccination (day 0). C3H mice (n=5) were immunized intramuscularly at days 0 and 28 with 1 µg doses of the indicated vaccine. The hexavalent vaccine included OspA from serotypes 1,2,3,4,5,7 at the molar equivalent of 1 µg each. The error bars indicated the standard deviation of the mean.
Biochemical analysis of OspA-ferritin Serotype 6 by SDS-PAGE after purification by size exclusion chromatography (A). Transmission electron microscopy image of OspA-ferritin serotype 6 nanoparticles (B). C3H mice (n=5) were immunized intramuscularly with the molar equivalent of 1 µg of the OspA-ferritin serotype 6 + Alum adjuvant (Monovalent) or OspA-ferritin serotypes 1-7 (Heptavalent) at week 0 and week 4. ELISA titers were measured 2 wks after 2nd immunization (week 6) of each vaccine. ELISA plate is coated with OspA-His Serotype 6.
A 2 step click chemistry strategy was used to attach 3M-012 to the ferritin nanoparticle. A DBCO-Peg4-maleimide linker was first attached to the cysteine on ferritin. After excess linker was removed, the Azide-3M-012 (A) was added. Mass spec analysis showing the unconjugated and conjugated protein with a Mass shift of 586.7 Daltons consistent with the addition of 3M-012 (B).