



**Figure 5.** Impact of VR environment on the hippocampal spatial representation. **(a)** Schematics of the virtual environments used in the experiment. Normal (left) physical boundaries of the arena and virtual boundaries of the VE are aligned; Shifted (center) VE is displaced leftwards by 20 cm; Star Field (right), no virtual boundaries, 3D array of white virtual cubes expanding beyond arena walls. **(b)** Individual examples of place fields of hippocampal pyramidal cells showing the center position of the field (asterisk) across four sequential conditions: Normal 1 – Shifted 1 - Normal 2 – Shifted 2. The center of the virtual arena is shown as blue bars for reference. White numbers indicate the peak firing rate of the cell (spikes/s). **(c)** Analysis of the place field center shift between conditions. Scatterplots showing X- and Y-axis shift of the location of center place fields across conditions: Normal 1 to Shifted 1 (top), Shifted 1 to Normal 2 (middle), Normal 2 to Shifted 2 (bottom). Gray shadows, 95% confidence interval of population shift estimate (n=20). Non-overlap of gray bar with dotted line indicates a significant place field shift in the given axis. **(d)** Examples, as in b, for different units recorded three days later across conditions: Normal-Shifted-Star field. **(e)** Same as c for conditions in d. Shift of place field centers between Normal and Shifted conditions was significant for length, but not width directions (Kruskall-Wallis n= 20, H=35.40,  $p < .001$  and H=5.92,  $p = .21$ , length and width, correspondingly) and between consecutive session shifts were tested with post hoc Wilcoxon paired-rank test (n=20, in c : Normal 1 to Shift 1,  $W=12$ ,  $p < .01$ ; Shift 1 to Normal 2,  $W=15$ ,  $p < .01$ ; Normal 2 to Shift 2,  $W=56$ ,  $p = .11$ ; in d: Normal to Shifted ,  $W=90$ ,  $p = .67$ ; Shifted to Star field,  $W=97$ ,  $p = .77$ ).