

## SUPPLEMENTARY INFORMATION

### Large-scale investigation of the olfactory receptor space using a microfluidic microwell array

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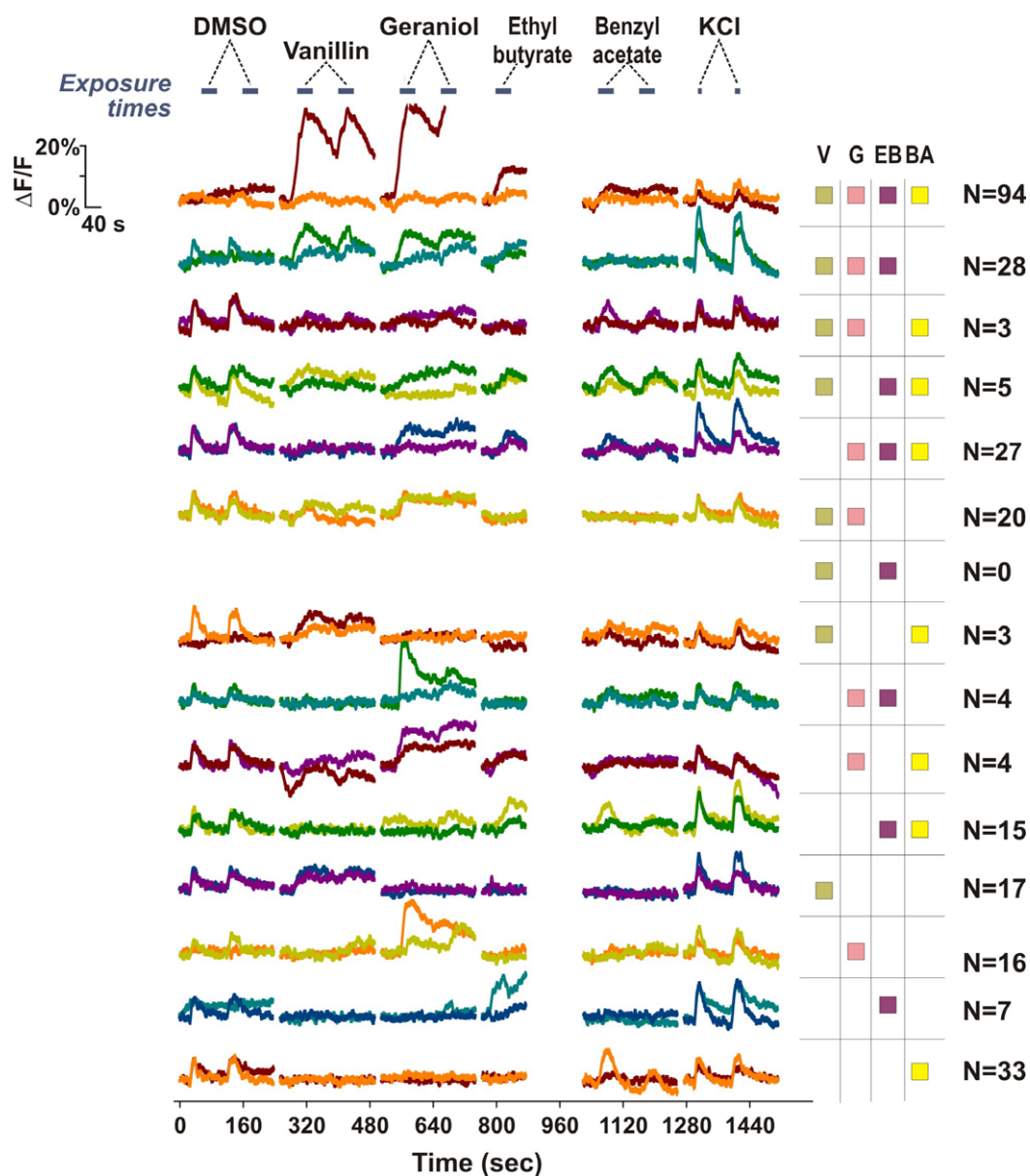
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**Supplementary Figure 1 (movie) legend.** Virtual array of 3,039 software-selected KCl-responsive OE cells. Our strategy was to use selection criteria that would detect all the responsive cells (within a given signal-to-noise ratio) as well as many false positives. False positives are usually due to relatively fast events, such as cell position shifts (due to flow instabilities) or cell death, overlapping in time with one of the stimuli. To eliminate the false positives, we developed a tool to allow a user to quickly browse through all the selected cells. A “quilt” movie containing all the putative responsive cells in a virtual array is built automatically and played for visual confirmation. The quilt movie is created by extracting a 20x20 pixel square around each region’s centroid and arraying all the squares into a square grid. The user then opens the stack of quilt images in MetaMorph and views the time-lapse images, row by row. Cells that are recognized as responders are given a binary value of 1. Cells that are artifacts (i.e. non-responsive) are given a value of 0. These binary values are arrayed in an Excel spreadsheet, matching the position that the cell image occupies in the “quilt” array. A MatLab routine then multiplies the Excel array of 0’s and 1’s to remove cells that have been selected out by the user.



**Supplementary Figure 2.** Response profile of individual OSNs to DMSO & odorants. Individual OSN traces of the highest and lowest responders for each group of odorant combinations (table, right) are displayed. The number of human-confirmed odorant-responsive cells is displayed on the far right column. Each trace pair is calibrated to the same Y-axis (% change in baseline fluorescence,  $\Delta F/F$ ) represented on the top left. The cut-off for inclusion is set at 2% of baseline. All traces are normalized to the first imaged frame in each odorant exposure.