Assessing a Linear Correlation Model to Predict Glomerular Volume Given the Total Number of Olfactory Sensory Neurons Expressing One Odor Receptor Type

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Glomeruli are areas within the olfactory bulb where olfactory sensory neurons (OSNs) with the same odor receptor synapse with their target mitral cells. A recent publication has correlated glomerular volume with the total number of OSNs. As part of an on-going research collaboration project, we counted the number of OSNs expressing the M72 receptor in serial sections taken from wildtype mice (n = 11), and then calculated the predicted volume of the M72 glomerulus based on the published linear correlation model (625,298 μm3). We also compared our mean number of M72-expressing OSNs per mouse with that of the published research in order to validate our use of the published correlation model. We found that the mean number of M72-expressing OSNs is 5599 ± 1403 (mean ± SD). While our mean was in range of the published model (5599 vs. 5265), we had a slightly larger standard deviation (1403 vs. 906). This could be the result of using data collected by multiple individuals rather than a single person being responsible for all OSN counting. In the future, we plan to measure glomerular volume to see if we can use the published linear correlation model to predict total number of OSNs.