

**Table S1. Summary of phenotypes observed in tongues of *Fst*<sup>-/-</sup> versus wild-type mice**

| Anterior tongue (fungiform/filiform papillae)   |   | Posterior tongue (intermolar eminence)                                       |   |
|---|---|--|---|
| Wild type   | <i>Fst</i> <sup>-/-</sup>                                 | Wild type  | <i>Fst</i> <sup>-/-</sup>   |
| Filiform papillae develop normally  | Filiform papillae develop normally                        | Filiform papillae develop normally   | No filiform papillae develop  |
| Clear demarcation of epithelial-mesenchymal border  | Dysplastic epithelial-mesenchymal border                  | Clear demarcation of epithelial-mesenchymal border                           | Dysplastic epithelial-mesenchymal border                            |
| <i>Sox2</i> expressed in developing taste placode/taste bud                                       | Excess and ectopic <i>Sox2</i> -positive domains          | <i>Sox2</i> not expressed  | Ectopic <i>Sox2</i> -expressing domains                             |
| Distinct patterning of papillae on anterior 2/3 of the tongue                                     | Abnormal size and disrupted spacing of fungiform papillae | Filiform papillae only   | Ectopic fungiform papillae-like structures                          |
| Wnt activity in developing taste placode/taste bud  | Decreased Wnt activity                                    | Wnt activity in filiform papillae only                                       | Wnt activity in ectopic fungiform papillae-like structures          |
| <i>Shh</i> expressed in developing taste placode/taste bud  | Decreased <i>Shh</i> expression                           | <i>Shh</i> is not expressed  | <i>Shh</i> expression in ectopic fungiform papillae-like structures |
| Fungiform papillae are innervated by projecting nerve fibers stained by PGP9.5                    | Normally is innervated                                    | No visible innervation by PGP9.5 staining                                    | Ectopic fungiform papillae-like structures are innervated           |
| Gustducin expressed in taste receptor cells of the taste bud at postnatal stages                  | Premature gustducin expression                            | Gustducin is not expressed   | Gustducin expression in ectopic fungiform papillae-like structures  |
| <i>Bmp7</i> expressed in developing taste placode/taste bud                                       | Expansion of <i>Bmp7</i> expression domains               | <i>Bmp7</i> is not expressed   | Ectopic expression of <i>Bmp7</i>                                   |
| Proliferating cells are concentrated along the epithelial-mesenchymal border and in the taste bud | No change in cell proliferation                           | Proliferating cells are concentrated along the epithelial-mesenchymal border | No change in cell proliferation                                     |