

Cellchat V2 Viz among NTC samples

This report serves as a preliminary validation for layer-layer communication analysis using cellchat v2. The purpose for these viz is to support the claim that layer-layer communication is legit as an extension of cell-cell communication. The *Objective* for this report is to validate that certain established communication between layers, e.g. layer to layer projects, can be detected in our dataset via `cellchat`.

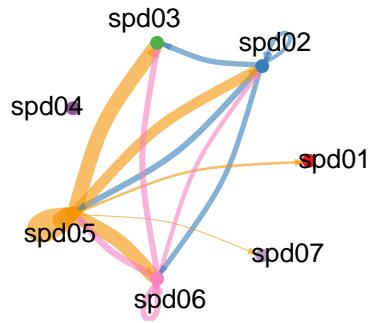
This report focus on the analysis among *NTC* samples.

Code

Results

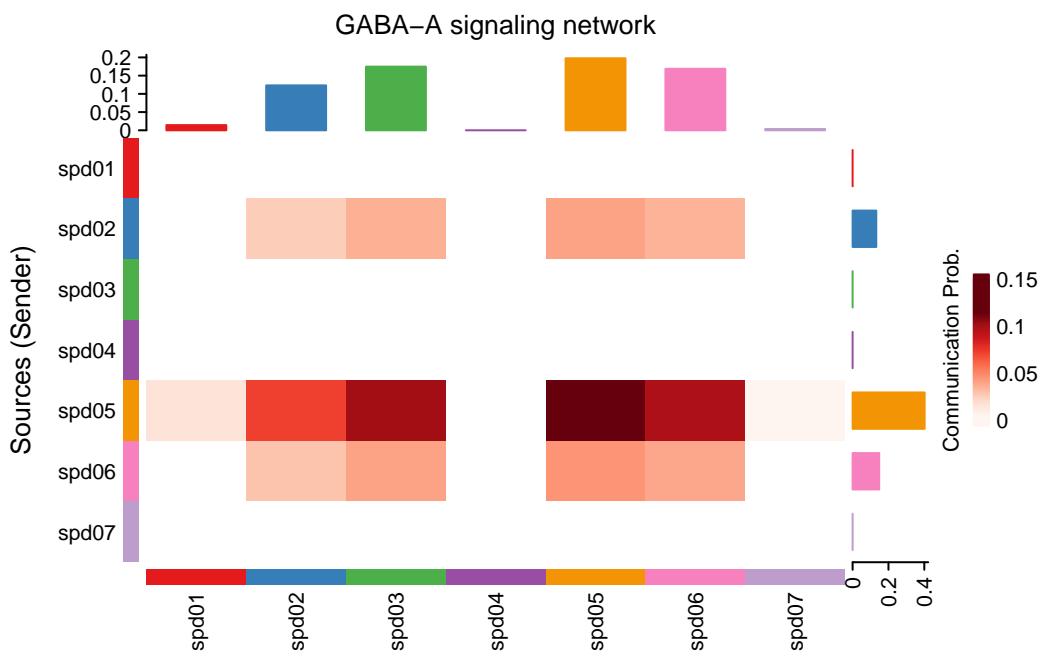
GABA pathways

```
netVisual_aggregate(cellchat, signaling = "GABA-A")
```



```
netVisual_heatmap(cellchat, signaling = "GABA-A", color.heatmap = "Reds")
```

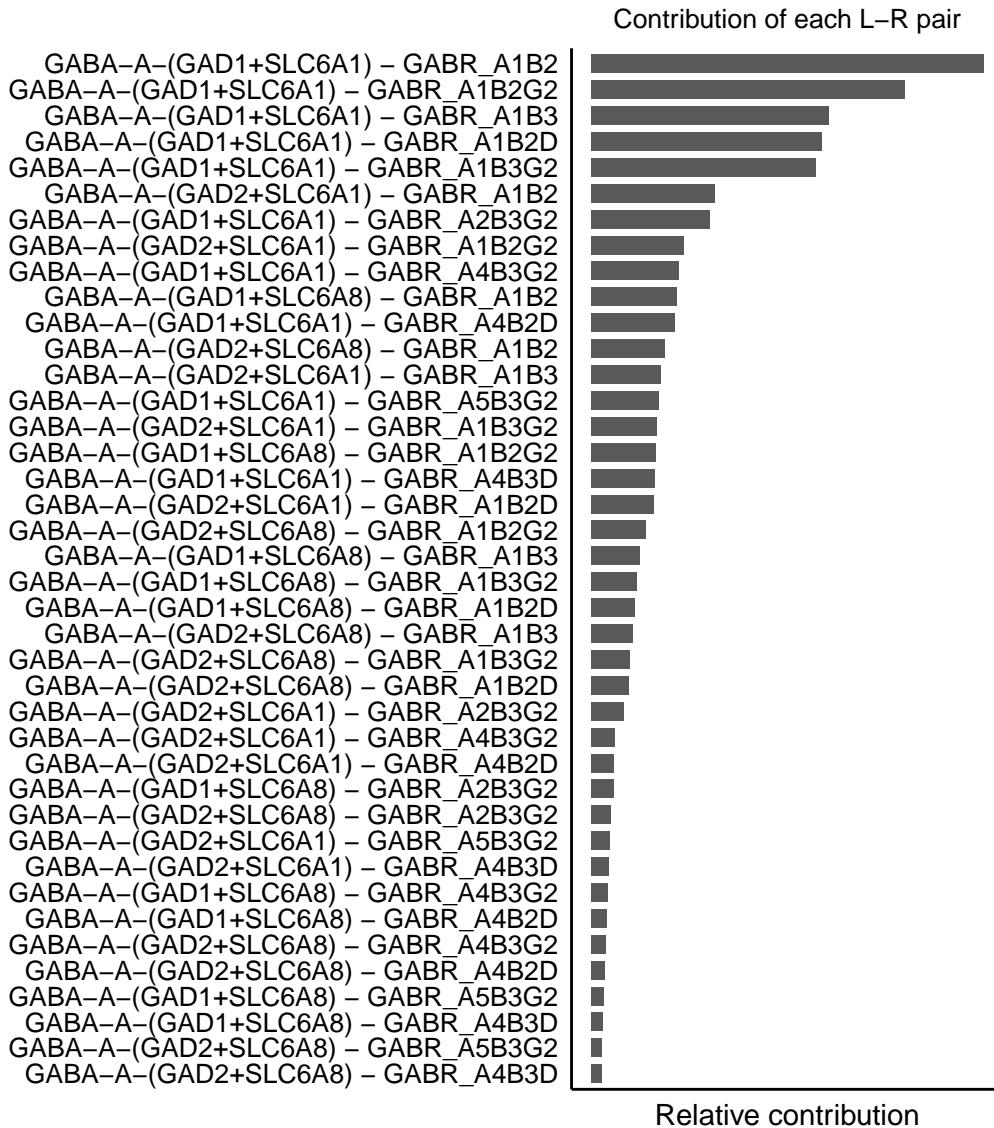
Do heatmap based on a single object



LR pairs in the GABA_A path

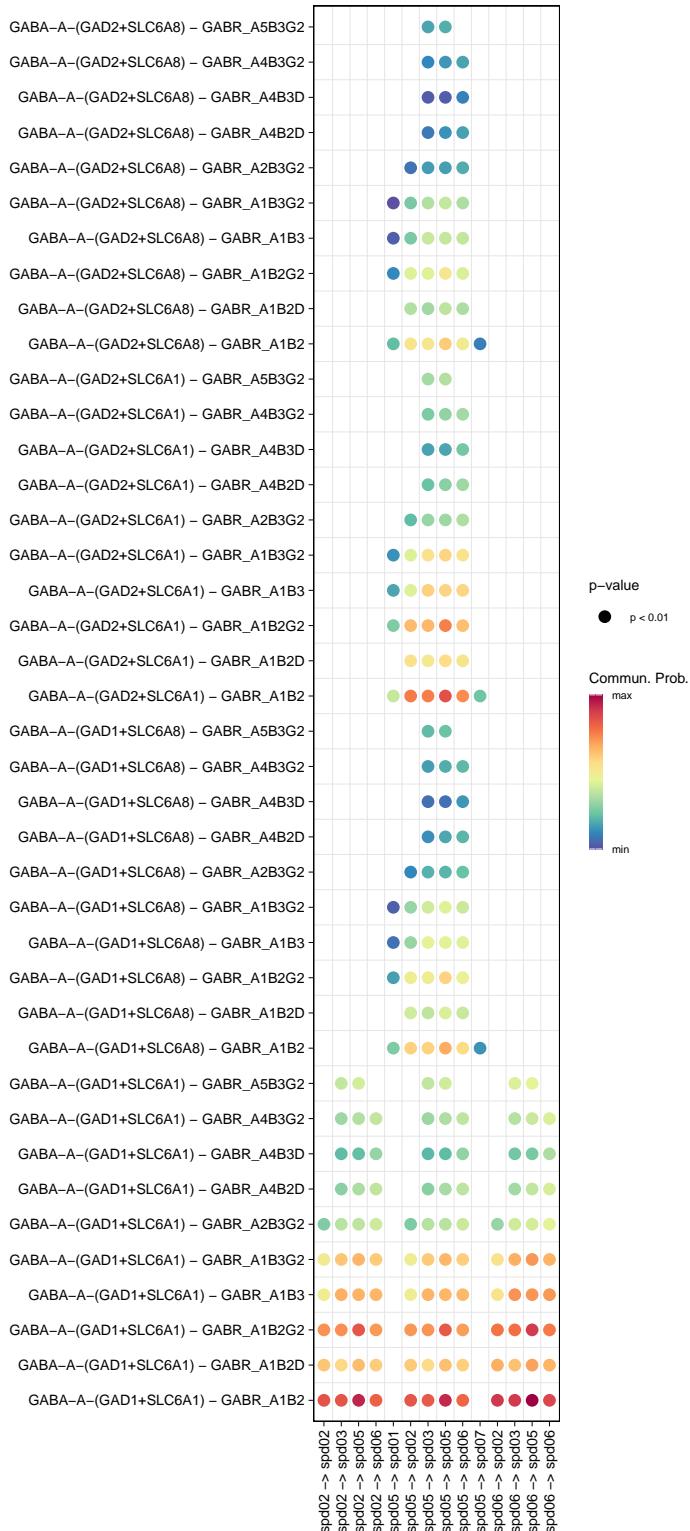
Here is a list of contributing LR pairs that are in the GABA_A pathway.

```
netAnalysis_contribution(cellchat, signaling = "GABA-A")
```



```
netVisual_bubble(cellchat, signaling = "GABA-A", remove.isolate = FALSE)
```

Comparing communications on a single object



(Supp Material) LR pairs GABA-A pathways in the cellphoneDB

Listing all the LR pairs in the GABA-A pathways in the data bases

```
# dplyr::glimpse(CellChatDB$interaction)
CellChatDB <- CellChatDB.human
rownames(CellChatDB$interaction) <- NULL
CellChatDB$interaction[  
  grep("GABA-A", CellChatDB$interaction$pathway_name, ignore.case = T),  
  c("pathway_name", "ligand", "receptor", "annotation")  
]
```

	pathway_name	ligand	receptor	annotation
2057	GABA-A	GABA-GAD1_SLC32A1	GABR_A1B3G2	Non-protein Signaling
2058	GABA-A	GABA-GAD1_SLC32A1	GABR_A1B2G2	Non-protein Signaling
2059	GABA-A	GABA-GAD1_SLC32A1	GABR_A1B2	Non-protein Signaling
2060	GABA-A	GABA-GAD1_SLC32A1	GABR_A1B3	Non-protein Signaling
2061	GABA-A	GABA-GAD1_SLC32A1	GABR_A1B2D	Non-protein Signaling
2062	GABA-A	GABA-GAD1_SLC32A1	GABR_A2B3G2	Non-protein Signaling
2063	GABA-A	GABA-GAD1_SLC32A1	GABR_A3B3G2	Non-protein Signaling
2064	GABA-A	GABA-GAD1_SLC32A1	GABR_A3B3Q	Non-protein Signaling
2065	GABA-A	GABA-GAD1_SLC32A1	GABR_A3B3E	Non-protein Signaling
2066	GABA-A	GABA-GAD1_SLC32A1	GABR_A4B3G2	Non-protein Signaling
2067	GABA-A	GABA-GAD1_SLC32A1	GABR_A4B3D	Non-protein Signaling
2068	GABA-A	GABA-GAD1_SLC32A1	GABR_A4B2D	Non-protein Signaling
2069	GABA-A	GABA-GAD1_SLC32A1	GABR_A5B3G2	Non-protein Signaling
2070	GABA-A	GABA-GAD1_SLC32A1	GABR_A6B3G2	Non-protein Signaling
2071	GABA-A	GABA-GAD1_SLC32A1	GABR_A6B3D	Non-protein Signaling
2072	GABA-A	GABA-GAD1_SLC6A1	GABR_A1B3G2	Non-protein Signaling
2073	GABA-A	GABA-GAD1_SLC6A1	GABR_A1B2G2	Non-protein Signaling
2074	GABA-A	GABA-GAD1_SLC6A1	GABR_A1B2	Non-protein Signaling
2075	GABA-A	GABA-GAD1_SLC6A1	GABR_A1B3	Non-protein Signaling
2076	GABA-A	GABA-GAD1_SLC6A1	GABR_A1B2D	Non-protein Signaling
2077	GABA-A	GABA-GAD1_SLC6A1	GABR_A2B3G2	Non-protein Signaling
2078	GABA-A	GABA-GAD1_SLC6A1	GABR_A3B3G2	Non-protein Signaling
2079	GABA-A	GABA-GAD1_SLC6A1	GABR_A3B3Q	Non-protein Signaling
2080	GABA-A	GABA-GAD1_SLC6A1	GABR_A3B3E	Non-protein Signaling
2081	GABA-A	GABA-GAD1_SLC6A1	GABR_A4B3G2	Non-protein Signaling
2082	GABA-A	GABA-GAD1_SLC6A1	GABR_A4B3D	Non-protein Signaling
2083	GABA-A	GABA-GAD1_SLC6A1	GABR_A4B2D	Non-protein Signaling
2084	GABA-A	GABA-GAD1_SLC6A1	GABR_A5B3G2	Non-protein Signaling
2085	GABA-A	GABA-GAD1_SLC6A1	GABR_A6B3G2	Non-protein Signaling

2086 GABA-A GABA-GAD1_SLC6A1 GABR_A6B3D Non-protein Signaling
2087 GABA-A GABA-GAD1_SLC6A11 GABR_A1B3G2 Non-protein Signaling
2088 GABA-A GABA-GAD1_SLC6A11 GABR_A1B2G2 Non-protein Signaling
2089 GABA-A GABA-GAD1_SLC6A11 GABR_A1B2 Non-protein Signaling
2090 GABA-A GABA-GAD1_SLC6A11 GABR_A1B3 Non-protein Signaling
2091 GABA-A GABA-GAD1_SLC6A11 GABR_A1B2D Non-protein Signaling
2092 GABA-A GABA-GAD1_SLC6A11 GABR_A2B3G2 Non-protein Signaling
2093 GABA-A GABA-GAD1_SLC6A11 GABR_A3B3G2 Non-protein Signaling
2094 GABA-A GABA-GAD1_SLC6A11 GABR_A3B3Q Non-protein Signaling
2095 GABA-A GABA-GAD1_SLC6A11 GABR_A3B3E Non-protein Signaling
2096 GABA-A GABA-GAD1_SLC6A11 GABR_A4B3G2 Non-protein Signaling
2097 GABA-A GABA-GAD1_SLC6A11 GABR_A4B3D Non-protein Signaling
2098 GABA-A GABA-GAD1_SLC6A11 GABR_A4B2D Non-protein Signaling
2099 GABA-A GABA-GAD1_SLC6A11 GABR_A5B3G2 Non-protein Signaling
2100 GABA-A GABA-GAD1_SLC6A11 GABR_A6B3G2 Non-protein Signaling
2101 GABA-A GABA-GAD1_SLC6A11 GABR_A6B3D Non-protein Signaling
2102 GABA-A GABA-GAD1_SLC6A12 GABR_A1B3G2 Non-protein Signaling
2103 GABA-A GABA-GAD1_SLC6A12 GABR_A1B2G2 Non-protein Signaling
2104 GABA-A GABA-GAD1_SLC6A12 GABR_A1B2 Non-protein Signaling
2105 GABA-A GABA-GAD1_SLC6A12 GABR_A1B3 Non-protein Signaling
2106 GABA-A GABA-GAD1_SLC6A12 GABR_A1B2D Non-protein Signaling
2107 GABA-A GABA-GAD1_SLC6A12 GABR_A2B3G2 Non-protein Signaling
2108 GABA-A GABA-GAD1_SLC6A12 GABR_A3B3G2 Non-protein Signaling
2109 GABA-A GABA-GAD1_SLC6A12 GABR_A3B3Q Non-protein Signaling
2110 GABA-A GABA-GAD1_SLC6A12 GABR_A3B3E Non-protein Signaling
2111 GABA-A GABA-GAD1_SLC6A12 GABR_A4B3G2 Non-protein Signaling
2112 GABA-A GABA-GAD1_SLC6A12 GABR_A4B3D Non-protein Signaling
2113 GABA-A GABA-GAD1_SLC6A12 GABR_A4B2D Non-protein Signaling
2114 GABA-A GABA-GAD1_SLC6A12 GABR_A5B3G2 Non-protein Signaling
2115 GABA-A GABA-GAD1_SLC6A12 GABR_A6B3G2 Non-protein Signaling
2116 GABA-A GABA-GAD1_SLC6A12 GABR_A6B3D Non-protein Signaling
2117 GABA-A GABA-GAD1_SLC6A13 GABR_A1B3G2 Non-protein Signaling
2118 GABA-A GABA-GAD1_SLC6A13 GABR_A1B2G2 Non-protein Signaling
2119 GABA-A GABA-GAD1_SLC6A13 GABR_A1B2 Non-protein Signaling
2120 GABA-A GABA-GAD1_SLC6A13 GABR_A1B3 Non-protein Signaling
2121 GABA-A GABA-GAD1_SLC6A13 GABR_A1B2D Non-protein Signaling
2122 GABA-A GABA-GAD1_SLC6A13 GABR_A2B3G2 Non-protein Signaling
2123 GABA-A GABA-GAD1_SLC6A13 GABR_A3B3G2 Non-protein Signaling
2124 GABA-A GABA-GAD1_SLC6A13 GABR_A3B3Q Non-protein Signaling
2125 GABA-A GABA-GAD1_SLC6A13 GABR_A3B3E Non-protein Signaling
2126 GABA-A GABA-GAD1_SLC6A13 GABR_A4B3G2 Non-protein Signaling
2127 GABA-A GABA-GAD1_SLC6A13 GABR_A4B3D Non-protein Signaling
2128 GABA-A GABA-GAD1_SLC6A13 GABR_A4B2D Non-protein Signaling

2129 GABA-A GABA-GAD1_SLC6A13 GABR_A5B3G2 Non-protein Signaling
2130 GABA-A GABA-GAD1_SLC6A13 GABR_A6B3G2 Non-protein Signaling
2131 GABA-A GABA-GAD1_SLC6A13 GABR_A6B3D Non-protein Signaling
2132 GABA-A GABA-GAD1_SLC6A6 GABR_A1B3G2 Non-protein Signaling
2133 GABA-A GABA-GAD1_SLC6A6 GABR_A1B2G2 Non-protein Signaling
2134 GABA-A GABA-GAD1_SLC6A6 GABR_A1B2 Non-protein Signaling
2135 GABA-A GABA-GAD1_SLC6A6 GABR_A1B3 Non-protein Signaling
2136 GABA-A GABA-GAD1_SLC6A6 GABR_A1B2D Non-protein Signaling
2137 GABA-A GABA-GAD1_SLC6A6 GABR_A2B3G2 Non-protein Signaling
2138 GABA-A GABA-GAD1_SLC6A6 GABR_A3B3G2 Non-protein Signaling
2139 GABA-A GABA-GAD1_SLC6A6 GABR_A3B3Q Non-protein Signaling
2140 GABA-A GABA-GAD1_SLC6A6 GABR_A3B3E Non-protein Signaling
2141 GABA-A GABA-GAD1_SLC6A6 GABR_A4B3G2 Non-protein Signaling
2142 GABA-A GABA-GAD1_SLC6A6 GABR_A4B3D Non-protein Signaling
2143 GABA-A GABA-GAD1_SLC6A6 GABR_A4B2D Non-protein Signaling
2144 GABA-A GABA-GAD1_SLC6A6 GABR_A5B3G2 Non-protein Signaling
2145 GABA-A GABA-GAD1_SLC6A6 GABR_A6B3G2 Non-protein Signaling
2146 GABA-A GABA-GAD1_SLC6A6 GABR_A6B3D Non-protein Signaling
2147 GABA-A GABA-GAD1_SLC6A8 GABR_A1B3G2 Non-protein Signaling
2148 GABA-A GABA-GAD1_SLC6A8 GABR_A1B2G2 Non-protein Signaling
2149 GABA-A GABA-GAD1_SLC6A8 GABR_A1B2 Non-protein Signaling
2150 GABA-A GABA-GAD1_SLC6A8 GABR_A1B3 Non-protein Signaling
2151 GABA-A GABA-GAD1_SLC6A8 GABR_A1B2D Non-protein Signaling
2152 GABA-A GABA-GAD1_SLC6A8 GABR_A2B3G2 Non-protein Signaling
2153 GABA-A GABA-GAD1_SLC6A8 GABR_A3B3G2 Non-protein Signaling
2154 GABA-A GABA-GAD1_SLC6A8 GABR_A3B3Q Non-protein Signaling
2155 GABA-A GABA-GAD1_SLC6A8 GABR_A3B3E Non-protein Signaling
2156 GABA-A GABA-GAD1_SLC6A8 GABR_A4B3G2 Non-protein Signaling
2157 GABA-A GABA-GAD1_SLC6A8 GABR_A4B3D Non-protein Signaling
2158 GABA-A GABA-GAD1_SLC6A8 GABR_A4B2D Non-protein Signaling
2159 GABA-A GABA-GAD1_SLC6A8 GABR_A5B3G2 Non-protein Signaling
2160 GABA-A GABA-GAD1_SLC6A8 GABR_A6B3G2 Non-protein Signaling
2161 GABA-A GABA-GAD1_SLC6A8 GABR_A6B3D Non-protein Signaling
2162 GABA-A GABA-GAD2_SLC32A1 GABR_A1B3G2 Non-protein Signaling
2163 GABA-A GABA-GAD2_SLC32A1 GABR_A1B2G2 Non-protein Signaling
2164 GABA-A GABA-GAD2_SLC32A1 GABR_A1B2 Non-protein Signaling
2165 GABA-A GABA-GAD2_SLC32A1 GABR_A1B3 Non-protein Signaling
2166 GABA-A GABA-GAD2_SLC32A1 GABR_A1B2D Non-protein Signaling
2167 GABA-A GABA-GAD2_SLC32A1 GABR_A2B3G2 Non-protein Signaling
2168 GABA-A GABA-GAD2_SLC32A1 GABR_A3B3G2 Non-protein Signaling
2169 GABA-A GABA-GAD2_SLC32A1 GABR_A3B3Q Non-protein Signaling
2170 GABA-A GABA-GAD2_SLC32A1 GABR_A3B3E Non-protein Signaling
2171 GABA-A GABA-GAD2_SLC32A1 GABR_A4B3G2 Non-protein Signaling

2172 GABA-A GABA-GAD2_SLC32A1 GABR_A4B3D Non-protein Signaling
2173 GABA-A GABA-GAD2_SLC32A1 GABR_A4B2D Non-protein Signaling
2174 GABA-A GABA-GAD2_SLC32A1 GABR_A5B3G2 Non-protein Signaling
2175 GABA-A GABA-GAD2_SLC32A1 GABR_A6B3G2 Non-protein Signaling
2176 GABA-A GABA-GAD2_SLC32A1 GABR_A6B3D Non-protein Signaling
2177 GABA-A GABA-GAD2_SLC6A1 GABR_A1B3G2 Non-protein Signaling
2178 GABA-A GABA-GAD2_SLC6A1 GABR_A1B2G2 Non-protein Signaling
2179 GABA-A GABA-GAD2_SLC6A1 GABR_A1B2 Non-protein Signaling
2180 GABA-A GABA-GAD2_SLC6A1 GABR_A1B3 Non-protein Signaling
2181 GABA-A GABA-GAD2_SLC6A1 GABR_A1B2D Non-protein Signaling
2182 GABA-A GABA-GAD2_SLC6A1 GABR_A2B3G2 Non-protein Signaling
2183 GABA-A GABA-GAD2_SLC6A1 GABR_A3B3G2 Non-protein Signaling
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2185 GABA-A GABA-GAD2_SLC6A1 GABR_A3B3E Non-protein Signaling
2186 GABA-A GABA-GAD2_SLC6A1 GABR_A4B3G2 Non-protein Signaling
2187 GABA-A GABA-GAD2_SLC6A1 GABR_A4B3D Non-protein Signaling
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2189 GABA-A GABA-GAD2_SLC6A1 GABR_A5B3G2 Non-protein Signaling
2190 GABA-A GABA-GAD2_SLC6A1 GABR_A6B3G2 Non-protein Signaling
2191 GABA-A GABA-GAD2_SLC6A1 GABR_A6B3D Non-protein Signaling
2192 GABA-A GABA-GAD2_SLC6A11 GABR_A1B3G2 Non-protein Signaling
2193 GABA-A GABA-GAD2_SLC6A11 GABR_A1B2G2 Non-protein Signaling
2194 GABA-A GABA-GAD2_SLC6A11 GABR_A1B2 Non-protein Signaling
2195 GABA-A GABA-GAD2_SLC6A11 GABR_A1B3 Non-protein Signaling
2196 GABA-A GABA-GAD2_SLC6A11 GABR_A1B2D Non-protein Signaling
2197 GABA-A GABA-GAD2_SLC6A11 GABR_A2B3G2 Non-protein Signaling
2198 GABA-A GABA-GAD2_SLC6A11 GABR_A3B3G2 Non-protein Signaling
2199 GABA-A GABA-GAD2_SLC6A11 GABR_A3B3Q Non-protein Signaling
2200 GABA-A GABA-GAD2_SLC6A11 GABR_A3B3E Non-protein Signaling
2201 GABA-A GABA-GAD2_SLC6A11 GABR_A4B3G2 Non-protein Signaling
2202 GABA-A GABA-GAD2_SLC6A11 GABR_A4B3D Non-protein Signaling
2203 GABA-A GABA-GAD2_SLC6A11 GABR_A4B2D Non-protein Signaling
2204 GABA-A GABA-GAD2_SLC6A11 GABR_A5B3G2 Non-protein Signaling
2205 GABA-A GABA-GAD2_SLC6A11 GABR_A6B3G2 Non-protein Signaling
2206 GABA-A GABA-GAD2_SLC6A11 GABR_A6B3D Non-protein Signaling
2207 GABA-A GABA-GAD2_SLC6A12 GABR_A1B3G2 Non-protein Signaling
2208 GABA-A GABA-GAD2_SLC6A12 GABR_A1B2G2 Non-protein Signaling
2209 GABA-A GABA-GAD2_SLC6A12 GABR_A1B2 Non-protein Signaling
2210 GABA-A GABA-GAD2_SLC6A12 GABR_A1B3 Non-protein Signaling
2211 GABA-A GABA-GAD2_SLC6A12 GABR_A1B2D Non-protein Signaling
2212 GABA-A GABA-GAD2_SLC6A12 GABR_A2B3G2 Non-protein Signaling
2213 GABA-A GABA-GAD2_SLC6A12 GABR_A3B3G2 Non-protein Signaling
2214 GABA-A GABA-GAD2_SLC6A12 GABR_A3B3Q Non-protein Signaling

2215 GABA-A GABA-GAD2_SLC6A12 GABR_A3B3E Non-protein Signaling
2216 GABA-A GABA-GAD2_SLC6A12 GABR_A4B3G2 Non-protein Signaling
2217 GABA-A GABA-GAD2_SLC6A12 GABR_A4B3D Non-protein Signaling
2218 GABA-A GABA-GAD2_SLC6A12 GABR_A4B2D Non-protein Signaling
2219 GABA-A GABA-GAD2_SLC6A12 GABR_A5B3G2 Non-protein Signaling
2220 GABA-A GABA-GAD2_SLC6A12 GABR_A6B3G2 Non-protein Signaling
2221 GABA-A GABA-GAD2_SLC6A12 GABR_A6B3D Non-protein Signaling
2222 GABA-A GABA-GAD2_SLC6A13 GABR_A1B3G2 Non-protein Signaling
2223 GABA-A GABA-GAD2_SLC6A13 GABR_A1B2G2 Non-protein Signaling
2224 GABA-A GABA-GAD2_SLC6A13 GABR_A1B2 Non-protein Signaling
2225 GABA-A GABA-GAD2_SLC6A13 GABR_A1B3 Non-protein Signaling
2226 GABA-A GABA-GAD2_SLC6A13 GABR_A1B2D Non-protein Signaling
2227 GABA-A GABA-GAD2_SLC6A13 GABR_A2B3G2 Non-protein Signaling
2228 GABA-A GABA-GAD2_SLC6A13 GABR_A3B3G2 Non-protein Signaling
2229 GABA-A GABA-GAD2_SLC6A13 GABR_A3B3Q Non-protein Signaling
2230 GABA-A GABA-GAD2_SLC6A13 GABR_A3B3E Non-protein Signaling
2231 GABA-A GABA-GAD2_SLC6A13 GABR_A4B3G2 Non-protein Signaling
2232 GABA-A GABA-GAD2_SLC6A13 GABR_A4B3D Non-protein Signaling
2233 GABA-A GABA-GAD2_SLC6A13 GABR_A4B2D Non-protein Signaling
2234 GABA-A GABA-GAD2_SLC6A13 GABR_A5B3G2 Non-protein Signaling
2235 GABA-A GABA-GAD2_SLC6A13 GABR_A6B3G2 Non-protein Signaling
2236 GABA-A GABA-GAD2_SLC6A13 GABR_A6B3D Non-protein Signaling
2237 GABA-A GABA-GAD2_SLC6A6 GABR_A1B3G2 Non-protein Signaling
2238 GABA-A GABA-GAD2_SLC6A6 GABR_A1B2G2 Non-protein Signaling
2239 GABA-A GABA-GAD2_SLC6A6 GABR_A1B2 Non-protein Signaling
2240 GABA-A GABA-GAD2_SLC6A6 GABR_A1B3 Non-protein Signaling
2241 GABA-A GABA-GAD2_SLC6A6 GABR_A1B2D Non-protein Signaling
2242 GABA-A GABA-GAD2_SLC6A6 GABR_A2B3G2 Non-protein Signaling
2243 GABA-A GABA-GAD2_SLC6A6 GABR_A3B3G2 Non-protein Signaling
2244 GABA-A GABA-GAD2_SLC6A6 GABR_A3B3Q Non-protein Signaling
2245 GABA-A GABA-GAD2_SLC6A6 GABR_A3B3E Non-protein Signaling
2246 GABA-A GABA-GAD2_SLC6A6 GABR_A4B3G2 Non-protein Signaling
2247 GABA-A GABA-GAD2_SLC6A6 GABR_A4B3D Non-protein Signaling
2248 GABA-A GABA-GAD2_SLC6A6 GABR_A4B2D Non-protein Signaling
2249 GABA-A GABA-GAD2_SLC6A6 GABR_A5B3G2 Non-protein Signaling
2250 GABA-A GABA-GAD2_SLC6A6 GABR_A6B3G2 Non-protein Signaling
2251 GABA-A GABA-GAD2_SLC6A6 GABR_A6B3D Non-protein Signaling
2252 GABA-A GABA-GAD2_SLC6A8 GABR_A1B3G2 Non-protein Signaling
2253 GABA-A GABA-GAD2_SLC6A8 GABR_A1B2G2 Non-protein Signaling
2254 GABA-A GABA-GAD2_SLC6A8 GABR_A1B2 Non-protein Signaling
2255 GABA-A GABA-GAD2_SLC6A8 GABR_A1B3 Non-protein Signaling
2256 GABA-A GABA-GAD2_SLC6A8 GABR_A1B2D Non-protein Signaling
2257 GABA-A GABA-GAD2_SLC6A8 GABR_A2B3G2 Non-protein Signaling

```

2258      GABA-A  GABA-GAD2_SLC6A8  GABR_A3B3G2 Non-protein Signaling
2259      GABA-A  GABA-GAD2_SLC6A8  GABR_A3B3Q Non-protein Signaling
2260      GABA-A  GABA-GAD2_SLC6A8  GABR_A3B3E Non-protein Signaling
2261      GABA-A  GABA-GAD2_SLC6A8  GABR_A4B3G2 Non-protein Signaling
2262      GABA-A  GABA-GAD2_SLC6A8  GABR_A4B3D Non-protein Signaling
2263      GABA-A  GABA-GAD2_SLC6A8  GABR_A4B2D Non-protein Signaling
2264      GABA-A  GABA-GAD2_SLC6A8  GABR_A5B3G2 Non-protein Signaling
2265      GABA-A  GABA-GAD2_SLC6A8  GABR_A6B3G2 Non-protein Signaling
2266      GABA-A  GABA-GAD2_SLC6A8  GABR_A6B3D Non-protein Signaling

```

SST pathways

There is no significant communication of SOMATOSTATIN signaling pathway

```
# netVisual_aggregate(cellchat, signaling = "SOMATOSTATIN")
```

confirm SST pathways are in the cellphoneDB

Confirm there's SST related LR pair in the database cell chat used to in the database.

```

# dplyr::glimpse(CellChatDB$interaction)
CellChatDB <- CellChatDB.human
CellChatDB$interaction[  

  grep("SST", CellChatDB$interaction$ligand, ignore.case = T),  

  c("interaction_name", "pathway_name")
]

```

	interaction_name	pathway_name
SST_SSTR1	SST_SSTR1	SOMATOSTATIN
SST_SSTR2	SST_SSTR2	SOMATOSTATIN
SST_SSTR3	SST_SSTR3	SOMATOSTATIN
SST_SSTR4	SST_SSTR4	SOMATOSTATIN
SST_SSTR5	SST_SSTR5	SOMATOSTATIN