```
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Pseudomonadales;f_Moraxellaceae;g_Acinetobacter;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Pseudomonadales;f_Pseudomonadaceae;g_Pseudomonas;_
d Bacteria;p Proteobacteria;c Gammaproteobacteria;o Pseudomonadales;f Moraxellaceae;g Psychrobacter;
 d__Bacteria;p__Campylobacterota;c__Campylobacteria;o__Campylobacterales;f__Campylobacteraceae;g__Campylobacter;__
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Enterobacteriaceae;_
 d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Enterobacteriaceae;g_Salmonella;s_Salmonella_enterica
\label{lem:d_bacteria}  \mbox{$d$\_Bacteria;$p$\_Firmicutes;$c$\_Bacilli;$o$\_Lactobacillales;$f$\_Listeriaceae;$g$\_Brochothrix;$\_$is the control of the contro
d_Bacteria;p__Firmicutes;c_Bacilli;o_Bacillales;f_Planococcaceae;g_Lysinibacillus;_
d Bacteria;p Proteobacteria;c Gammaproteobacteria;o Pseudomonadales;f Moraxellaceae;g Psychrobacter;s uncultured bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Shewanellaceae;g_Shewanella;s_Shewanella_morhuae
d_Bacteria;p_Firmicutes;c_Bacilli;o_Lactobacillales;f_Carnobacteriaceae;g_Carnobacterium;_
 d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Pseudomonadales;f_Moraxellaceae;g_Acinetobacter;s_uncultured_Acinetobacter
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Aeromonadaceae;g_Aeromonas;_
\label{lem:d_bacteria}  \  \, \underline{\text{d}}\underline{\text{Bacteria}}; \underline{\text{p}}\underline{\text{Firmicutes}}; \underline{\text{c}}\underline{\text{Bacilli}}; \underline{\text{o}}\underline{\text{Lactobacillales}}; \underline{\text{f}}\underline{\text{Vagococcaceae}}; \underline{\text{g}}\underline{\text{Vagococcus}}; \underline{\text{d}}\underline{\text{constant}}; \underline{\text{done}}; \underline{\text{
d_Bacteria;p_Firmicutes;c_Bacilli;o_Staphylococcales;f_Staphylococcaceae;g_Macrococcus;_
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Shewanellaceae;g_Shewanella;
{\tt d\_Bacteria;p\_Bacteroidota;c\_Bacteroidia;o\_Flavobacteriales;f\_Weeksellaceae;g\_Chryseobacterium;\__locations and the control of the control
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Yersiniaceae;g_Serratia;
d_Bacteria;p_Firmicutes;c_Bacilli;o_Lactobacillales;f_Carnobacteriaceae;g_Carnobacterium;s_uncultured_bacterium
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Providencia;\_Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Providencia;\_Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Providencia;\_Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Providencia;Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Providencia;Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Providencia;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammaproteobacteria;Gammapro
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Flavobacteriaceae;g_Flavobacterium;
d Bacteria:p Proteobacteria:c Gammaproteobacteria:o Enterobacterales:f Morganellaceae:g Proteus:
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Oxalobacteraceae;_;
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Enterobacterales;f\_Shewanellaceae;g\_Shewanella;s\_uncultured\_bacterium
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Micrococcaceae;g_Arthrobacter;s_Arthrobacter_sp.
 d__Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Enterobacterales;f__Pseudoalteromonadaceae;g__Pseudoalteromonas;__
{\tt d\_Bacteria;p\_Firmicutes;c\_Bacilli;o\_Lactobacillales;f\_Enterococcaceae;g\_Enterococcus;s\_uncultured\_organism}
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Micrococcaceae;g_Paeniglutamicibacter;_
d Bacteria;p Firmicutes;c Bacilli;o Lactobacillales;f Streptococcaceae;g Streptococcus;s uncultured bacterium
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Micrococcaceae;g_Glutamicibacter;_
{\tt d\_Bacteria;p\_Actinobacteriota;c\_Actinobacteria;o\_Propionibacteriales;f\_Propionibacteriaceae;g\_Cutibacterium;s\_uncultured\_bacterium;
 d_Bacteria;p_Firmicutes;c_Bacilli;o_Lactobacillales;f_Streptococcaceae;g_Lactococcus;s_uncultured_bacterium
 d__Bacteria;p__Firmicutes;c__Bacilli;o__Bacillales;f__Bacillaceae;g__Bacillus;__
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Pseudomonadales;f\_Pseudomonadaceae;g\_Pseudomonas;s\_Pseudomonas\_sp.
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Pseudomonadales;f\_Pseudomonadaceae;g\_Pseudomonas;s\_uncultured\_bacterium
\label{eq:decomposition} \begin{tabular}{ll} $d$ & Bacteria; $p\_$ Firmicutes; $c\_$ Bacilli; $o\_$ Lactobacillales; $f\_$ Enterococcaceae; $g\_$ Enterococcus; $\_$ and $G$ is a constant of the property of the 
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Oxalobacteraceae;g_Janthinobacterium;s_uncultured_bacterium
d_Bacteria;p__Firmicutes;c_Bacilli;o_Lactobacillales;f__Listeriaceae;g__Listeria;s__Listeria_monocytogenes
{\tt d\_Bacteria;p\_Bacteroidota;c\_Bacteroidia;o\_Flavobacteriales;f\_Weeksellaceae;g\_Chryseobacterium;s\_Chryseobacterium\_sp.
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Yersiniaceae;g_Yersinia;s_Yersinia_ruckeri
 d__Bacteria;p__Firmicutes;c__Bacilli;o__Lactobacillales;f__Carnobacteriaceae;g__Granulicatella;_
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Micrococcaceae;g_Micrococcus;_
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Corynebacteriales;f_Corynebacteriaceae;g_Corynebacterium;s_Corynebacterium_falsenii
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Corynebacteriales;f_Corynebacteriaceae;g_Turicella;s_uncultured_bacterium
 \begin{tabular}{ll} $d$\_Bacteria; p\_Firmicutes; c\_Bacilli; o\_Bacillales; f\_Bacillaceae; g\_Bacillus; s\_uncultured\_bacterium \\ \end{tabular} 
 d_Bacteria;p_Deinococcota;c_Deinococci;o_Deinococcales;f_Trueperaceae;g_Truepera;s_Truepera_radiovictrix
{\tt d\_Bacteria;p\_Bacteroidota;c\_Bacteroidia;o\_Flavobacteriales;f\_Flavobacteriaceae;g\_Flavobacterium;s\_Flavobacterium\_sp.
d_Bacteria;p_Firmicutes;c_Bacilli;o_Staphylococcales;f_Staphylococcaceae;g_Staphylococcus;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Vibrionaceae;g_Salinivibrio;_
\label{lem:d_Bacteria} \\ \texttt{d}\_\texttt{Bacteria}; \\ \texttt{p}\_\texttt{Firmicutes}; \\ \texttt{c}\_\texttt{Bacilli}; \\ \texttt{o}\_\texttt{Lactobacillales}; \\ \texttt{f}\_\texttt{Lactobacillaceae}; \\ \texttt{g}\_\texttt{Lactobacillus}; \\ \texttt{d}\_\texttt{d}
{\tt d\_Bacteria;p\_Actinobacteriota;c\_Actinobacteria;o\_Corynebacteriales;f\_Corynebacteriaceae;g\_Corynebacterium;}
         _Bacteria;p__Firmicutes;c__Bacilli;o__Staphylococcales;f__Staphylococcaceae;g__Staphylococcus;s__uncultured_bacterium
d_Bacteria;p_Firmicutes;c_Clostridia;o_Peptostreptococcales-Tissierellales;f_Family_XI;g_Ezakiella;s_uncultured_bacterium
d Racterian Actinohacteriotaic Actinohacteriaio Convinehacterialesif Convinehacteriaceaeid Convinehacteriumis uncultured hacterium
```

```
d__Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Enterobacterales;f__Pasteurellaceae;g__Haemophilus;s__uncultured_organism
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Sphingomonadales;f_Sphingomonadaceae;g_Sphingomonas;
{\tt d\_Bacteria;p\_Proteobacteria;c\_Alphaproteobacteria;o\_Rhodobacterales;f\_Rhodobacteraceae;g\_Paracoccus;s\_uncultured\_bacterium
 d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Neisseriaceae;g_Uruburuella;_
d_Bacteria;p_Actinobacteriota;c_Thermoleophilia;o_Gaiellales;f_uncultured;g_uncultured;s_uncultured_bacterium
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Intrasporangiaceae;g_Tetrasphaera;
\label{eq:d_Bacteria} $$ d\_Bacteria; p\_Proteobacteria; c\_Gammaproteobacteria; o\_Burkholderiales; f\_Comamonadaceae; g\_Polaromonas; \_Polaromonas; \_Polaromon
{\tt d\_Bacteria}; {\tt p\_Proteobacteria}; {\tt c\_Gammaproteobacteria}; {\tt o\_Pseudomonadales}; {\tt f\_Moraxellaceae}; {\tt g\_Enhydrobacter}; {\tt s\_uncultured\_bacterium}
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Vibrionaceae;g_Vibrio;_
d_Bacteria;p_Firmicutes;c_Bacilli;o_Exiguobacterales;f_Exiguobacteraceae;g_Exiguobacterium;
 \begin{tabular}{ll} $d$\_Bacteria; p\_Firmicutes; c\_Bacilli; o\_Bacillales; f\_Bacillaceae; g\_Bacillus; s\_Bacillus\_megaterium \end{tabular} 
d Bacteria;p Proteobacteria;c Gammaproteobacteria;o Pseudomonadales;f Halomonadaceae;g Halomonas;
 d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Flavobacteriaceae;g_Flavobacterium;s_Flavobacterium_phocarum
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gamma proteobacteria;o\_Burkholderiales;f\_Oxalobacteraceae;g\_Massilia;s\_uncultured\_bacterium}
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Pseudomonadales;f\_Moraxellaceae;g\_Acinetobacter;s\_uncultured\_bacterium
d Bacteria;p Firmicutes;c Clostridia;o Peptostreptococcales-Tissierellales;f Peptostreptococcaceae;g Peptostreptococcus;s uncultured bacterium
d Bacteria:p Fusobacteriota:c Fusobacteriia:o Fusobacteriales:f Fusobacteriaceae:a Fusobacterium:
{\tt d\_Bacteria;p\_Bacteroidota;c\_Bacteroidia;o\_Flavobacteriales;f\_Flavobacteriaceae;g\_Imtechella;s\_Imtechella\_halotolerans}
 {\tt d\_Bacteria;p\_Firmicutes;c\_Bacilli;o\_Staphylococcales;f\_Staphylococcaceae;g\_Jeotgalicoccus;s\_uncultured\_bacterium}
 d Bacteria:p Cyanobacteria:c Cyanobacteriia:o Pseudanabaenales:f Pseudanabaenaceae:a Pseudanabaena PCC-7429:
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Micrococcaceae;g_Kocuria;_
{\tt d\_Bacteria; p\_Proteobacteria; c\_Gamma proteobacteria; o\_Enterobacterales; f\_Vibrionaceae; g\_Vibrio; s\_uncultured\_bacterium for the contract of the contra
{\tt d\_Bacteria;p\_Actinobacteriota;c\_Actinobacteria;o\_Micrococcales;f\_Micrococcaceae;g\_Rothia;s\_uncultured\_bacterium}
d Bacteria;p Campylobacterota;c Campylobacteria;o Campylobacterales;f Arcobacteraceae;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Enterobacteriaceae;g_Enterobacter;_
 d__Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Burkholderiales;f__Oxalobacteraceae;g__Massilia;__
 d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Brevibacteriaceae;g_Brevibacterium;_
\label{lem:d_bacteria} \\ \begin{subarray}{ll} $d\_Bacteria; p\_Actinobacteriota; c\_Acidimicrobiia; o\_Actinomarinales; f\_uncultured; g\_uncultured; s\_uncultured\_bacterium \\ \begin{subarray}{ll} $d\_Bacteria; p\_Actinobacteriota; c\_Acidimicrobiia; o\_Actinomarinales; f\_uncultured; g\_uncultured; s\_uncultured\_bacterium \\ \begin{subarray}{ll} $d\_Bacteria; p\_Actinobacteriota; c\_Acidimicrobiia; o\_Actinomarinales; f\_uncultured; s\_uncultured\_bacterium \\ \begin{subarray}{ll} $d\_Bacteria; p\_Actinobacteriota; c\_Acidimicrobiia; o\_Actinobacteriota; c\_Acidimicrobiia; o\_Actinobacteriota; s\_Actinobacteriota; s
d_Bacteria;p_Chloroflexi;c_Gitt-GS-136;o_Gitt-GS-136;f_Gitt-GS-136;g_Gitt-GS-136;_
d Bacteria;p Firmicutes;c Bacilli;o Lactobacillales;f Carnobacteriaceae;g Alloiococcus;s uncultured bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Pseudomonadales;f_Moraxellaceae;g_Alkanindiges;_
 d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Weeksellaceae;g_Chryseobacterium;s_uncultured_bacterium
           _Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Enterobacterales;f__Yersiniaceae;g__Yersinia;
 d__Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Enterobacterales;f__Enterobacteriaceae;g__Escherichia-Shigella;__
d_Bacteria;p__Verrucomicrobiota;c__Verrucomicrobiae;o__Chthoniobacterales;f__Chthoniobacteraceae;g__Candidatus_Udaeobacter;__
\label{local_d_bacteria} $$ d\_Bacteria; p\_Actinobacteriota; c\_Actinobacteria; o\_Corynebacteriales; f\_Corynebacteriaceae; g\_Lawsonella; s\_uncultured\_bacterium for the control of the con
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Corynebacteriales;f_Nocardiaceae;g_Rhodococcus;_
d Bacteria;p Actinobacteriota;c Actinobacteria;o Micrococcales;f Micrococcaceae; ;
           _Bacteria;p__Firmicutes;c__Clostridia;o__Peptostreptococcales-Tissierellales;f__Family_XI;g__Anaerococcus;s__uncultured_bacterium
 d__Bacteria;p__Actinobacteriota;c__Thermoleophilia;o__Solirubrobacterales;f__67-14;g__67-14;__
 d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Acetobacterales;f_Acetobacteraceae;g_Rubritepida;s_uncultured_bacterium
d_Bacteria;p_Acidobacteriota;c_Blastocatellia;o_Pyrinomonadales;f_Pyrinomonadaceae;g_RB41;s_uncultured_bacterium
\label{lem:d_Bacteria} \\ \texttt{d} \underline{\hspace{0.5cm}} \text{Bacteria}; \\ \texttt{p} \underline{\hspace{0.5cm}} \text{Actinobacteriota}; \\ \texttt{c} \underline{\hspace{0.5cm}} \text{Actinobacteria}; \\ \texttt{o} \underline{\hspace{0.5cm}} \text{Micrococcales}; \\ \texttt{f} \underline{\hspace{0.5cm}} \text{Microbacteria}; \\ \texttt{o} \underline{\hspace{0.5cm}} \text{Mic
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Pasteurellaceae;g_Avibacterium;_
d Bacteria;p Actinobacteriota;c Actinobacteria;o Micrococcales;f Microbacteriaceae;q Rhodoluna;
d_Bacteria;p_Firmicutes;c_Bacilli;o_Staphylococcales;f_Gemellaceae;g_Gemella;s_uncultured_bacterium
 d__Bacteria;p__Actinobacteriota;c__Acidimicrobiia;o__Actinomarinales;f__uncultured;g__uncultured;__
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Pseudomonadales;f_Moraxellaceae;g_Psychrobacter;s_Psychrobacter_sp.
{\tt d\_Bacteria;p\_Firmicutes;c\_Clostridia;o\_Lachnospirales;f\_Lachnospiraceae;g\_Blautia;s\_uncultured\_bacterium}
 \begin{tabular}{ll} $d$\_Bacteria; p\_Bacteroidota; c\_Bacteroidia; o\_Sphingobacteriales; f\_Sphingobacteriaceae; g\_Pedobacter; and the substitution of the substitutio
\label{local_d_bacteria} \\ \mbox{$d$\_Bacteria;$p$\_Synergistates;$f$\_Synergistaceae;$g$\_Jonquetella;$s$\_Jonquetella_anthroping the local content of the loc
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Shewanellaceae;g_Shewanella;s_Shewanella_putrefaciens
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Enterobacteriae;f\_Aeromonadaceae;g\_Oceanisphaera;s\_uncultured\_bacterium
 d_Bacteria;p_Gemmatimonadota;c_Gemmatimonadetes;o_Gemmatimonadales;f_Gemmatimonadaceae;g_Gemmatimonas;
```

```
Bacteria; Proteobacteria; Gammaproteobacteria; Pseudomonadales; Nitrincolaceae; Nitrincola;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Vibrionaceae;g_Photobacterium;_
 \\ \texttt{d\_Bacteria}; \texttt{p\_Actinobacteriota}; \texttt{c\_Actinobacteria}; \texttt{o\_Actinomycetales}; \texttt{f\_Actinomycetaceae}; \texttt{g\_Actinomycetaceae}; \texttt{d\_Actinomyces}; \\ \texttt{d\_Bacteria}; \texttt{o\_Actinomycetaceae}; \texttt{d\_Actinomycetaceae}; \texttt{d\_Actinomycetaceae}; \texttt{d\_Actinomyceae}; \\ \texttt{d\_Bacteria}; \texttt{o\_Actinomycetaceae}; \texttt{d\_Actinomyceae}; \\ \texttt{d\_Actinomyceae}; \texttt{d\_Actinomyceae}; \\ \texttt{d\_Actino
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Moellerella;s\_Providencia\_sp.
\verb|d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Microbacteriaceae;g_Leucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae;d_Neucobacteriaceae
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Streptomycetales;f_Streptomycetaceae;g_E1B-B3-114;s_Rhacophorus_dennysi
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Flavobacteriaceae;g_Flavobacterium;s_Flavobacterium_tegetincola
             _Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Burkholderiales;f__Neisseriaceae;g__Neisseria;s__uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Comamonadaceae;g_Giesbergeria;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Rhizobiales;f_Rhizobiaceae;__;_
{\tt d\_Bacteria}; {\tt p\_Proteobacteria}; {\tt c\_Alphaproteobacteria}; {\tt o\_Sphingomonadales}; {\tt f\_Sphingomonadacea}; {\tt g\_Sphingomonadacea}; {\tt d\_Sphingomonadacea}; {\tt d\_Sphing
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Weeksellaceae;g_Empedobacter;
d Bacteria;p Bacteroidota;c Bacteroidia;o Flavobacteriales;f Flavobacteriaceae;g Flavobacterium;s uncultured bacterium
d_Bacteria;p_Firmicutes;c_Bacilli;o_Bacillales;f_Bacillaceae;g_Allobacillus;s_Allobacillus_halotolerans
             _Bacteria;p__Firmicutes;c__Negativicutes;o__Veillonellales-Selenomonadales;f__Veillonellaceae;g__Veillonella;s__uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Alteromonadaceae;g_Rheinheimera;s_uncultured_Rheinheimera
  d__Bacteria;p__Actinobacteriota;c__Actinobacteria;o__Micrococcales;f__Micrococcaceae;g__Arthrobacter;__
 \begin{tabular}{ll} $d$\_Bacteria; p$\_Actinobacteriota; c$\_Actinobacteria; o$\_Propionibacteriales; f$\_Nocardioidaceae; g$\_Nocardioides; s$\_Nocardioides$\_gilvus$  \end{tabular} 
\label{lem:d_Bacteria}  d\_Bacteria; p\_Proteobacteria; c\_Gammaproteobacteria; o\_Enterobacterales; f\_Erwiniaceae; \underline{\hspace{0.5cm}}; \underline{\hspace{0.5cm}}
d Bacteria:p Cyanobacteria:c Cyanobacteriia:o Chloroplast:f Chloroplast:g Chloroplast:s uncultured bacterium
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Rhodobacterales;f_Rhodobacteraceae;g_Paracoccus;_
d Bacteria;p Actinobacteriota;c Actinobacteria;o Propionibacteriales;f Nocardioidaceae;g Nocardioides;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Pseudomonadales;f_Moraxellaceae;g_Alkanindiges;s_uncultured_bacterium
 d__Bacteria;p__Proteobacteria;c__Alphaproteobacteria;o__Rhizobiales;f__Rhizobiaceae;g__Allorhizobium-Neorhizobium-Pararhizobium-Rhizobium;_
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacteria;o\_Enterobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacterales;f\_Pasteurellaceae;g\_Haemophilus;\_Gammaproteobacterales;g\_Haemophilus;\_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;g\_Haemophilus;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_Gammaproteobacterales;_
d Bacteria;p Proteobacteria;c Gammaproteobacteria;o Enterobacterales;f Shewanellaceae;g Shewanella;s Shewanella sp.
d Bacteria;p Campylobacterota;c Campylobacteria;o Campylobacterales;f Arcobacteraceae;g Malaciobacter;s uncultured bacterium
d_Bacteria;p_Firmicutes;c_Clostridia;o_Lachnospirales;f_Lachnospiraceae;g_[Eubacterium]_hallii_group;s_uncultured_bacterium
 d__Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Enterobacterales;f__Psychromonadaceae;g__Psychromonas;s__Psychromonas_arctica
{\tt d\_Bacteria;p\_Proteobacteria;c\_Alphaproteobacteria;o\_Caulobacterales;f\_Caulobacteraceae;g\_Phenylobacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_uncultured\_bacterium;s\_u
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Sphingobacteriales;f_Sphingobacteriaceae;g_Sphingobacterium;s_Sphingobacterium_sp.
  d__Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Burkholderiales;f__Comamonadaceae;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Comamonadaceae;g_Acidovorax;_
d Bacteria;p Proteobacteria;c Gammaproteobacteria;o Burkholderiales;f Comamonadaceae;q Variovorax;
d Bacteria;p Cyanobacteria;c Cyanobacteriia;o Chloroplast;f Chloroplast;g Chloroplast;
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Idiomarinaceae;g_Aliidiomarina;
             _Bacteria;p__Proteobacteria;c__Gammaproteobacteria;o__Enterobacterales;f__Alteromonadaceae;g__Rheinheimera;s__uncultured_bacterium
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Xanthomonadales;f\_Xanthomonadalee;g\_Vulcaniibacterium;s\_uncultured\_bacterium;p\_vertical control of the control of 
{\tt d\_Bacteria;p\_Actinobacteriota;c\_Actinobacteria;o\_Bifidobacteriales;f\_Bifidobacteriaceae;g\_Bifidobacterium;s\_uncultured\_bacterium;b\_Locateriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacteriales;f\_Bifidobacterial
\label{lem:d_Bacteria} $$ d\_Bacteria; p\_Proteobacteria; c\_Gammaproteobacteria; o\_Enterobacteria; sp\_Pseudoalteromonadaceae; g\_Pseudoalteromonadaceae; g\_Pseudoalteromonadaceae; sp\_Pseudoalteromonadaceae; sp\_Pseudoae; sp\_Pseudoae; sp\_Pseudoae; sp\_Pseudoae; sp\_Pseu
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Flavobacteriaceae;g_Myroides;s_Myroides_odoratimimus
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Flavobacteriaceae;g_Gillisia;s_uncultured_bacterium
d_Bacteria;p_Firmicutes;c_Bacilli;o_Bacillales;f_Planococcaceae;g_Planococcus;
             _Bacteria;p__Bacteroidota;c__Bacteroidia;o__Sphingobacteriales;f__Sphingobacteriaceae;g__Pedobacter;s__uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Alcaligenaceae;g_Alcaligenes;_
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonas;\_Burkholderiales;f\_Comamonadaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonaceae;g\_Tepidimonacea
d Bacteria;p Proteobacteria;c Gammaproteobacteria;o Burkholderiales;f Burkholderiaceae;q Ralstonia;
\label{local_d_bacteria} $$ d\_Bacteria; p\_Firmicutes; c\_Clostridia; o\_Peptostreptococcales-Tissierellales; f\_Family\_XI; g\_Anaerococcus; and the substitution of the 
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Alcaligenaceae;g_uncultured;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Rhodobacterales;f_Rhodobacteraceae;g_Rhodobacter;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Legionellales;f_Legionellaceae;g_Legionella;s_uncultured_bacterium
             Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Azospirillales;f_uncultured;g_uncultured;s_uncultured_bacterium
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Propionibacteriales;f_Nocardioidaceae;g_Aeromicrobium;_
{\tt d\_Bacteria}; {\tt p\_Proteobacteria}; {\tt c\_Gammaproteobacteria}; {\tt o\_Enterobacterales}; {\tt f\_Vibrionaceae}; {\tt g\_Salinivibrio}; {\tt s\_Salinivibrio}\_ {\tt proteolyticus}
d Bacteria;p Actinobacteriota;c Actinobacteria;o Bifidobacteriales;f Bifidobacteriaceae;g Bifidobacterium;
d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Micrococcales;f_Micrococcaceae;g_Rothia;_
d Bacteria: Proteobacteria: Gammaproteobacteria: Enterobacterales: Enterobacteriaceae: Escherichia-Shigella: Escherichia coli
```

```
_Bacteria;p__Actinobacteriota;c__Actinobacteria;o__Micrococcales;f__Microbacteriaceae;g__Microbacterium;s__Microbacterium_sp.
 d Bacteria:p Actinobacteriota:c Actinobacteria:o Micrococcales:f Intrasporangiaceae:g Aguipuribacter:
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Neisseriaceae;g_uncultured;s_uncultured_bacterium
{\tt d\_Bacteria;p\_Patescibacteria;c\_Saccharimonadia;o\_Saccharimonadales;f\_Saccharimonadales;g\_Saccharimonadales;s\_uncultured\_Candidatus}
\label{lem:continuous} $$ d\_Bacteria; p\_Chloroflexi; c\_KD4-96; o\_KD4-96; f\_KD4-96; g\_KD4-96; s\_uncultured\_bacterium $$ f_KD4-96; f\_KD4-96; f\_KD4
{\tt d\_Bacteria;p\_Firmicutes;c\_Bacilli;o\_Lactobacillales;f\_Aerococcaeae;g\_Aerococcus;s\_uncultured\_bacterium}
d Bacteria:p Firmicutes:c Bacilli:o Lactobacillales:f Aerococcaceae:g Abiotrophia:s uncultured bacterium
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Sphingobacteriales;f_Sphingobacteriaceae;_;
 d__Bacteria;p__Bacteroidota;c__Bacteroidia;o__Chitinophagales;f__Chitinophagaceae;g__uncultured;__
 d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Burkholderiaceae;g_Burkholderia-Caballeronia-Paraburkholderia;s_uncultured_organism
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Neisseriaceae;g_Uruburuella;s_Neisseria_sp.
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Burkholderiales;f\_Hydrogenophilaceae;g\_Hydrogenophilus;\_Institution of the control o
d_Bacteria;p_Actinobacteriota;c_Acidimicrobiia;o_IMCC26256;f_IMCC26256;g_IMCC26256;s_uncultured_bacterium
\label{lem:d_bacteria} \mbox{$d$\_Bacteria;$p$\_Actinobacteriota;$c$\_Acidimicrobiia;$o$\_Microtrichales;$f$\_uncultured;$g$\_uncultured;$s$\_uncultured\_bacterium
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Rhizobiales;f_Rhizobiaceae;g_Pseudochrobactrum;_
 d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Acetobacterales;f_Acetobacteraceae;g_Acidiphilium;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Pasteurellaceae;g_Aggregatibacter;s_uncultured_bacterium
{\tt d\_Bacteria}; {\tt p\_Firmicutes}; {\tt c\_Clostridia}; {\tt o\_Lachnospirales}; {\tt f\_Lachnospiraceae}; {\tt g\_Coprococcus}; {\tt s\_uncultured\_bacterium}
\label{eq:d_bacteria} $$ $ $ d_Bacteria; p_Firmicutes; c_Clostridia; o_Peptostreptococcales-Tissierellales; f_Family_XI; g_Finegoldia; s_uncultured_bacterium $$ $ d_Bacteria; p_Firmicutes; c_Clostridia; o_Peptostreptococcales-Tissierellales; f_Family_XI; g_Finegoldia; s_uncultured_bacterium $$ d_Bacteria; p_Firmicutes; c_Clostridia; o_Peptostreptococcales-Tissierellales; f_Family_XI; g_Finegoldia; s_uncultured_bacterium $$ d_Bacteria; p_Finegoldia; s_uncultured_bacterium $$ d_Bacterium $$ d_Bacteriu
d_Bacteria;p_Bacteroidota;c_Bacteroidia;o_Flavobacteriales;f_Flavobacteriaceae;g_Myroides;s_bacterium_28W232
d Bacteria;p Actinobacteriota;c Acidimicrobiia;o Microtrichales;f Illumatobacteraceae;g uncultured;s uncultured bacterium
d_Bacteria;p_Firmicutes;c_Bacilli;o_Lactobacillales;f_Vagococcaceae;g_Vagococcus;s_uncultured_bacterium
 d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_B1-7BS;g_B1-7BS;s_uncultured_bacterium
 d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Burkholderiales;f_Comamonadaceae;g_Comamonas;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Caulobacterales;f_Hyphomonadaceae;g_SWB02;s_uncultured_bacterium
{\tt d\_Bacteria}; {\tt p\_Actinobacteriota}; {\tt c\_Coriobacteria}; {\tt o\_Coriobacteriales}; {\tt f\_Coriobacteriaceae}; {\tt g\_Collinsella}; {\tt s\_uncultured\_bacterium}
\label{lem:d_Bacteria} $$ d\_Bacteria; p\_Actinobacteriota; c\_Acidimicrobiia; o\_Microtrichales; f\_uncultured; g\_uncultured; and the substitution of the substitution o
{\tt d\_Bacteria;p\_Proteobacteria;c\_Alphaproteobacteria;o\_Acetobacterales;f\_Acetobacteraceae;g\_Craurococcus-Caldovatus;\_Acetobacteraceae;g\_Craurococcus-Caldovatus;\_Acetobacterales;f\_Acetobacteraceae;g\_Craurococcus-Caldovatus;\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Acetobacterales;f\_Ace
d Bacteria; Proteobacteria; Alphaproteobacteria; Reyranellales; Reyranellales; Reyranellaceae; Reyranella;
             _Bacteria;p__Actinobacteriota;c__Actinobacteria;o__Propionibacteriales;f__Nocardioidaceae;g__Nocardioides;s__Nocardioides_aquaticus
 d_Bacteria;p_Actinobacteriota;c_Actinobacteria;o_Propionibacteriales;f_Nocardioidaceae;g_Nocardioides;s_uncultured_bacterium
  d__Bacteria;p__Proteobacteria;c__Alphaproteobacteria;o__Rhizobiales;f__Beijerinckiaceae;g__Methylobacterium-Methylorubrum;__
\label{eq:d_Bacteria} $$ d_Bacteria; p_Proteobacteria; c_Alphaproteobacteria; o_Rhizobiales; f_Beijerinckiaceae; g_Methylobacterium-Methylorubrum; s_uncultured_bacterium-Methylorubrum; b_uncultured_bacterium-Methylorubrum; b_uncultured_bacterium-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Methylorubrum-Meth
d_Bacteria;p_Proteobacteria;c_Alphaproteobacteria;o_Rhizobiales;f_Hyphomicrobiaceae;g_Pedomicrobium;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Xanthomonadales;f_Xanthomonadaceae;g_Stenotrophomonas;s_Stenotrophomonas_sp.
\label{eq:d_bacteria} \\ \text{d\_Bacteria;p\_Proteobacteria;c\_Alphaproteobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadaceae;g\_Erythrobacteria;o\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomonadales;f\_Sphingomo
d_Bacteria;p_Fusobacteriota;c_Fusobacteriia;o_Fusobacteriales;f_Fusobacteriaceae;g_Fusobacterium;s_Fusobacteriaceae_bacterium
 d_Bacteria;p_Firmicutes;c_Clostridia;o_Oscillospirales;f_Ruminococcaceae;g_Faecalibacterium;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Morganellaceae;g_Providencia;s_Providencia_alcalifaciens
{\tt d\_Bacteria;p\_Proteobacteria;c\_Gammaproteobacteria;o\_Enterobacterales;f\_Morganellaceae;g\_Moellerella;\__enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_Enterobacteria;o\_E
 \begin{tabular}{ll} $d$\_Bacteria; p\_Firmicutes; c\_Clostridia; o\_Lachnospirales; f\_Lachnospiraceae; g\_Dorea; \_Clostridia; o\_Lachnospiraceae; g\_Dorea; g\_Doreae; g\_Dore
d_Bacteria;p_Campylobacterota;c_Campylobacteria;o_Campylobacteriaes;f_Arcobacteraceae;g_Arcobacteraceae;s_uncultured_bacterium
d_Bacteria;p_Proteobacteria;c_Gammaproteobacteria;o_Enterobacterales;f_Hafniaceae;g_Hafnia-Obesumbacterium;_
d Bacteria;p Bacteroidota;c Bacteroidia;o Bacteroidales;f Bacteroidaceae;g Bacteroides;
  d__Bacteria;p__Verrucomicrobiota;c__Verrucomicrobiae;o__Chthoniobacterales;f__Chthoniobacteraceae;g__Candidatus_Udaeobacter;s__uncultured_bacterium
d_Bacteria;p_Firmicutes;c_Bacilli;o_Lactobacillales;f_Lactobacillaceae;g_Levilactobacillus;_
{\tt d\_Bacteria;p\_Firmicutes;c\_Bacilli;o\_Erysipelotrichales;f\_Erysipelatoclostridiaceae;g\_Erysipelotrichaceae\_UCG-003;s\_uncultured\_bacterium
{\tt d\_Bacteria;p\_Firmicutes;c\_Bacilli;o\_Lactobacillales;f\_Lactobacillaceae;g\_Lactobacillus;s\_uncultured\_bacterium}
```

d Bacteria:p Bacteroidota:c Bacteroidia:o Sphingobacteriales:f Sphingobacteriaceae:a Sphingobacterium:

d\_Bacteria;p\_Bacteroidota;c\_Bacteroidia;o\_Chitinophagales;f\_Chitinophagaceae;g\_Cnuella;