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Supplementary file

- **Fig. S1** The evolutionary topological tree of the OTU system with four types of tube film (abundance values greater than 10)
- **Fig. S2** The heat-map diagram of different tubing biofilm samples and double hierarchical clustering of bacterial communities
- Fig. S3 Top-100 features OTU in different samples of abundance heat-map
- **Fig. S4** Clusters of orthologous groups (COG) of proteins comment result chart of dominant species homologous genome

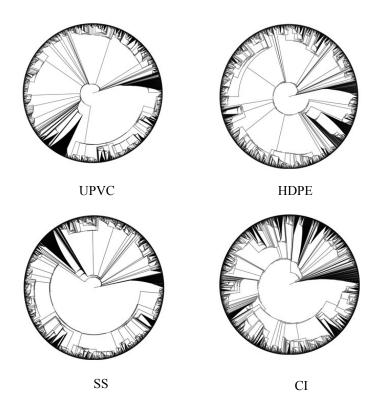


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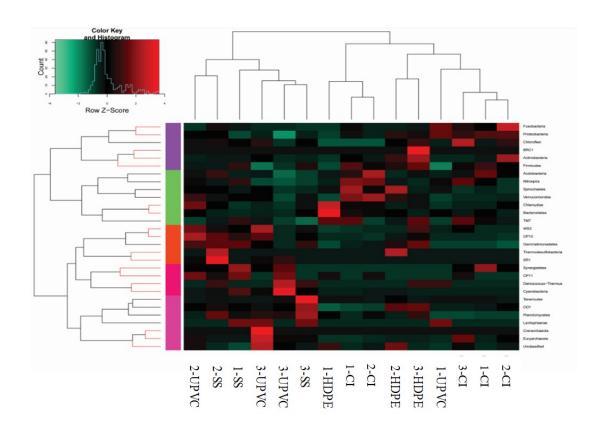


Fig. S2 The heat-map diagram of different tubing biofilm samples and double hierarchical clustering of bacterial communities

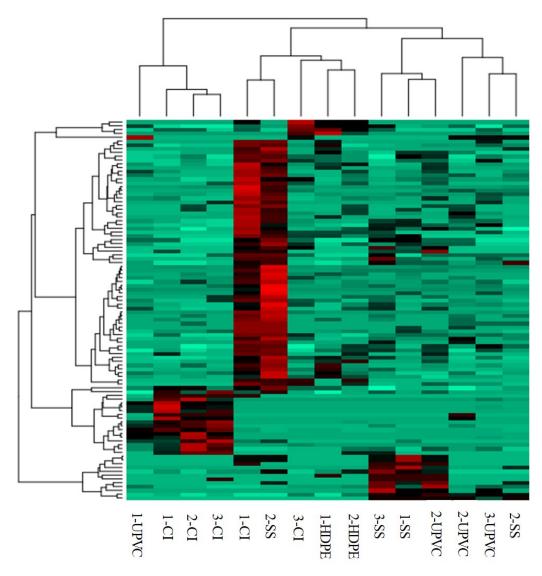


Fig. S3 Top-100 features OTU in different samples of abundance heat-map

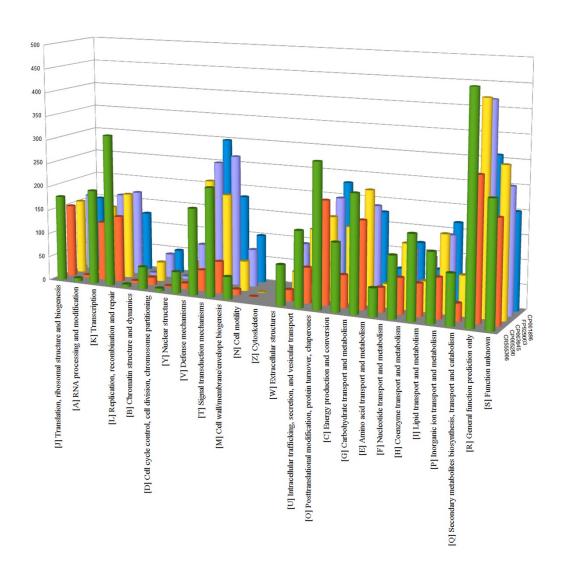


Fig. S4 Clusters of orthologous groups (COG) of proteins comment result chart of dominant species homologous genome