

Table S1: The information of sheep in this study.

| No. | Breeds | Antibiotic treatment | Region | Health condition |
|-----|----------------------------|----------------------|-------------------------|------------------|
| 1 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 2 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 3 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 4 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 5 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 6 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 7 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 8 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 9 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 10 | Dorset sheep(DsS) | none | Qinghai Province, China | healthy |
| 11 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 12 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 13 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 14 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 15 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 16 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 17 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 18 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 19 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 20 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 21 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 22 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 23 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 24 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 25 | Small Tail Han sheep(STHS) | none | Qinghai Province, China | healthy |
| 26 | Tibetan sheep(TS) | none | Qinghai Province, China | healthy |
| 27 | Tibetan sheep(TS) | none | Qinghai Province, China | healthy |
| 28 | Tibetan sheep(TS) | none | Qinghai Province, China | healthy |
| 29 | Tibetan sheep(TS) | none | Qinghai Province, China | healthy |
| 30 | Tibetan sheep(TS) | none | Qinghai Province, China | healthy |
| 31 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 32 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 33 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 34 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 35 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 36 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 37 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 38 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 39 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |
| 40 | Dorper sheep(DrS) | none | Qinghai Province, China | healthy |

Table S2: Sequence data of samples.

| Group | Raw sequences | High quality valid sequences | OTUs | Average valid sequences of sample |
|-------|---------------|---------------------------------|------|--------------------------------------|
| DrS | 444002 | 355132 | 7039 | 35514 |
| DsS | 641786 | 507753 | 6887 | 33851 |
| TS | 203332 | 167035 | 4112 | 33407 |
| STHS | 405144 | 329485 | 8257 | 32949 |

Table S3: The estimators of sequence diversity and richness.

| Sample ID | 0.97 | | | |
|--------------|---------|---------|---------|---------|
| | Simpson | Chao1 | ACE | Shannon |
| DsS1 | 0.996 | 2723.14 | 2937.31 | 9.55 |
| DsS2 | 0.997 | 3103.62 | 3327.68 | 9.9 |
| DsS3 | 0.997 | 3439.89 | 3488.37 | 9.98 |
| DsS4 | 0.997 | 2832.73 | 2905.67 | 9.71 |
| DsS5 | 0.997 | 2385.47 | 2429.78 | 9.88 |
| DsS6 | 0.998 | 3486.62 | 3701.14 | 10.19 |
| DsS7 | 0.996 | 2691.09 | 2827.07 | 9.49 |
| DsS8 | 0.998 | 3813.87 | 3798.53 | 10.25 |
| DsS9 | 0.998 | 3631 | 3776.38 | 10.19 |
| DsS10 | 0.997 | 3491.47 | 3434.29 | 10.09 |
| STHS1 | 0.998 | 3629.71 | 3849.4 | 10.4 |
| STHS2 | 0.998 | 3640.8 | 3639.86 | 10.4 |
| STHS3 | 0.998 | 3488.14 | 3687.34 | 10.17 |
| STHS4 | 0.998 | 3320.24 | 3442.62 | 10.21 |
| STHS5 | 0.998 | 3621.41 | 3607.46 | 10.36 |
| STHS6 | 0.998 | 2446.48 | 2459.22 | 10.2 |
| STHS7 | 0.998 | 3567.37 | 3575.85 | 10.44 |
| STHS8 | 0.997 | 2720.1 | 2858.37 | 9.99 |
| STHS9 | 0.998 | 3521.68 | 3520.49 | 10.23 |
| STHS10 | 0.997 | 3640.33 | 3765.47 | 10.11 |
| STHS11 | 0.971 | 733.57 | 712.97 | 6.9 |
| STHS12 | 0.975 | 1159.52 | 1106.44 | 7.44 |
| STHS13 | 0.991 | 1620.74 | 1601.05 | 8.38 |
| STHS14 | 0.984 | 1173 | 1173 | 7.96 |
| STHS15 | 0.973 | 690.92 | 691.66 | 6.81 |
| TS1 | 0.958 | 1138.99 | 1169.45 | 7.14 |
| TS2 | 0.995 | 2407.35 | 2506.83 | 9.32 |
| TS3 | 0.992 | 1649 | 1649.72 | 8.9 |
| TS4 | 0.978 | 1574.28 | 1681.46 | 7.57 |
| TS5 | 0.983 | 1156.66 | 1125.47 | 7.5 |
| DrS1 | 0.989 | 1680.66 | 1748.88 | 8.34 |
| DrS2 | 0.986 | 1007.79 | 1019.94 | 7.56 |

| | | | | |
|-------|---------|---------|----------|-------|
| DrS3 | 0.983 | 1895.23 | 1914.18 | 8.45 |
| DrS4 | 0.984 | 959.14 | 971.54 | 7.42 |
| DrS5 | 0.994 | 2840.34 | 3021.31 | 9.43 |
| DrS6 | 0.993 | 2206 | 2206 | 9.54 |
| DrS7 | 0.997 | 3350.73 | 3344.35 | 9.97 |
| DrS8 | 0.997 | 2853.69 | 3018.84 | 10.09 |
| DrS9 | 0.998 | 2366.15 | 2372.82 | 10.02 |
| DrS10 | 0.996 | 2907.86 | 3048.11 | 9.75 |
| Mean | 0.991 | 2514.17 | 2577.91 | 9.26 |
| ±SD | ±0.0095 | ±990.66 | ±1027.96 | ±1.16 |