

## Studies on Ruminal *Prevotellas*: Exploration of Their Diversity and Ecology

### ルーメン内 *Prevotella* 属細菌の多様性および生態に関する研究

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Ruminant animals (e.g. cattle and sheep) harbor micro-organisms in their stomach which is called rumen. The rumen microbes include bacteria, fungi and protozoa, and they give ruminant animals a unique ability to digest and convert plant fiber into energy source. Among the microbes in the rumen, bacteria play a key role in the digestion process. Recent studies indicated that the bacteria belonging to the genus *Prevotella* are predominant in the rumen. Therefore, the genus *Prevotella* is one of the most important group in the rumen fermentation. In this study, 16S rDNA-based molecular monitoring of rumen *Prevotella* was carried out to estimate the diversity and function of the bacteria belonging to this genus. Total DNA was extracted from rumen digesta of 3 sheep fed 2 diets with different hay to concentrate ratios (9:1 and 2:8). Real-time PCR quantification of *Prevotella* genus revealed that relative abundance of this genus in total rumen bacteria ranged from 13.5% to 19.7%, while the representative species *Prevotella bryantii* and *Prevotella ruminicola* accounted only for 0.065% and 3.8%, respectively. The sum of proportions of 10 representative rumen bacterial species was found to be 2.4% to 4.2% in total rumen bacteria. The *Prevotella* population tended to increase when animals were fed concentrate diet. Denaturing gradient gel electrophoresis analysis for *Prevotella* genus revealed shifts in *Prevotella* community composition with the diet. Analysis of 16S rDNA clone library showed significant differences ( $P=0.001$ ) between prevotellas detected from sheep on diets with different hay to concentrate ratios. The majority (88.5%) of *Prevotella* clones had <97% sequence similarity with known rumen *Prevotella*. Overall, a total of 75 distinct operational taxonomic units (OTUs) were identified in the clone libraries. More number of OTUs and higher diversity indices were found in the library from hay diet. The data suggest that uncultured *Prevotella* is more abundant than representative rumen bacteria including known *Prevotella*. Judging from the distribution of this genus under the different dietary conditions, the members of this genus appear to have metabolic specialties. More diverse group of prevotellas may be involved in digestion of hay based diet compared with the digestion of concentrate diet.