linkage between a phenolic acid and the carbohydrate of hydrolysable tannins. TAH has not previously been reported in bacterial systems, having only ever been described in fungi. The enzyme is considerably smaller than the fungal enzyme - 59 kDa compared with the 186 kDa fungal glycoprotein. *Sel. ruminantium* TAH is induced by the presence of tannins in the growth medium. We have established basic kinetic parameters for TAH using methyl gallate as substrate. TAH has been shown to be released from cells in the presence of Triton X-100, raising the possibility that it may be sequestered in extracellular vesicles. Purified enzyme has been obtained and 13 amino acids were sequenced at the N terminus and 10 amino acids at an internal peptide derived from Endo-Lys C hydrolysis and HPLC purification. From the amino acid sequence information, degenerate primers have been synthesised and used in a PCR reaction to generate a TAH-specific DNA probe. Currently a *Sel. ruminantium* K2 gene library is being screened for the TAH gene which will be sequenced and examined for regulatory motifs that control tannin responsiveness.

In both cases these organisms provide two advantages to the animal. Firstly, by virtue of their growth, they provide essential microbial protein for the animal. Secondly, these organisms help reduce the effective level of dietary tannin and thereby alleviate some of the anti-nutritional effects. There may also be other rumen microbial species that thrive in the presence of phenolic compounds, each forming part of a complex consortium to detoxify tannins. Mixed enrichment cultures have been used to isolate some of these additional species.

**Tannin-resistant ruminal bacteria from East African ruminants.** AA Odenyo, PO Osuji (*International Livestock Research Institute, P.O. Box 5689, Addis Ababa, Ethiopia)*

Five strains of rumen bacteria resistant to tannin (crude extracts, tannic acid) were isolated from enrichment cultures of the rumen microflora of sheep, goat and antelope established in medium containing high concentration of tannin extracts or tannic acid. One of the strains (ES11) from sheep was a facultatively anaerobic, Gram-positive, *Streptococcus* which grew in medium containing up to 40g $l^{-1}$ tannin extracts or 30g $l^{-1}$ tannic acid. Another strain (ES14.2) was an obligately anaerobic, Gram-variable rod containing rounded bodies, occurring in singles, pairs or short chains which grew in medium containing up to 50g $l^{-1}$ tannin extracts or tannic acid. Three strains EAT 2.1 (antelope), ES 3.1 (sheep), and EG 19 (goat) were curved rods, obligately anaerobic, Gram-negative and highly motile and were characterized as *Selenomonas* species. *Selenomonas* strains grew in medium containing 50g $l^{-1}$ tannin extracts and 50, 70 and 60g $l^{-1}$ tannic acid respectively. The *Streptococcus* strain and one *Selenomonas* strain (EATT2.1) were able to hydrolyze gallic acid, while two *Selenomonas* strains (ES3.1 and EG19) hydrolysed tannic acid but not gallic acid. All isolates were able to grow in medium containing up to 8g $l^{-1}$ condensed tannins. Growth was very slow when soluble carbohydrate was excluded from the medium.

**Tannic acid-resistant *Streptococcus* sp. from the rumen.** S Muhammed[1,2], T Acamovic[2], CS Stewart[1] ([1]*Rowett Research*