



## MVUMI UPDATE




AUGUST 2003

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## BACKGROUND

- Mvumi Hospital serves south and eastern parts of Dodoma Rural District
  - Serves population of over 200,000
  - Treats 200-400 cases of TBRF per year
  - TBRF was fifth most common cause of admission to Mvumi Hospital Children's Ward last year (164 cases in under 5s)
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## Tick surveys

- Samples from 501 houses in 7 villages close to Mvumi found 87% of houses tick infested- range from 62% in Makang'wa to 98% in Mloda (Talbert and Mushi)
- Sleeping areas most heavily infested

## Molecular studies on ticks

- Fukunaga et al (2001) analysed and compared mitochondrial 16S rDNA sequences of 13 ticks from Mvumi with published sequences
- Closest to *Ornithodoros porcinus domesticus* ( part of *Ornithodoros moubata* complex)

## *Borrelia* infection in ticks

- Molecular studies by Fukunaga et al of ticks from Mvumi (VBZD 2001)
- Method: nested-PCR technique to detect flagellin gene DNA
- Results:
  - 8/13 ticks were positive
  - 62% infected with *Borrelia*

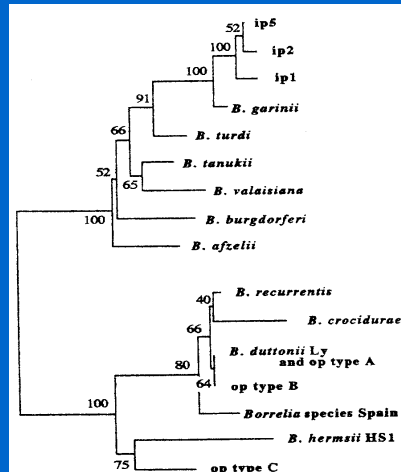
## Flagellin gene sequence analysis

- 3 types of sequence found:
  - opA 3 ticks identical to *Borrelia duttonii* strain Ly
  - opB 4 ticks differed by only 1 base substitution with no change in amino acid
  - opC 1 tick differed by 24 nucleotide substitutions and 3 base deletions resulting in 6 different aminoacids and 1 aminoacid deletion

Phylogenetic tree for flagellin gene sequence of *Borrelia*

Mvumi sequences

- op type A
- op type B
- op Type C



A new species of *Borrelia*?

Phylogenetic analysis shows it to be different from known Old World

*Borrelia*

## Further studies

- Fukunaga found *Borrelia* in 30 out of 67 (45%) ticks from 6 houses in Mvumi 2002 (unpublished)
- Individual household infection rate of ticks varied from 19-80%
- Flagellin gene sequence analysis of 18 PCR products found 5 types

## Sequence types

- Type 1 identical to *Borrelia duttonii* Ly
- Type 2 same amino acid sequence as Ly but 1 base substitution
- Type 3,4 and 5 same amino acid structure as opC “new species” but vary in number of base substitutions (22-24)

⋮

## New species *Borrelia* in humans?

- Yes
- Details from Kisinza's study of blood samples from children in Muungano 2002-3 to be presented later
- New species not yet cultured from blood (Cutler's 5 clinical isolates all *B. duttonii*)

⋮

## Thanks to our collaborators

- Prof. Masahito Fukunaga, Fukuyama University, Japan
- Dr. Sally Cutler, VLA, DEFRA, UK
- Dr. Philip McCall, Liverpool School of Tropical Medicine, UK
- Mr. William Kisinza, National Institute for Medical Research, Tanzania