Evidence for Karyogamy and Exchange of Genetic Material

Marianne K. Poxleitner, et al.

Presenter: Justin Bradshaw
What do you see?
What the public sees...

Thanks for the Pina Colada!!!!
Giardiasis

- Diarrheal illness
- ~20,000 reported cases annually (CDC, 2003–2005)
- 2,000,000 estimated cases annually (CDC 2007)
- A primary cause of US
FIGURE 1. Incidence* of giardiasis, by state — United States, 2005

* Per 100,000 population.
† No cases reported to CDC.
FIGURE 2. Number* of giardiasis case reports, by age group and year — United States, 2003–2005

* In 1,000s.
† Case reports decreased with increased age. For each 5-year subgroup, the number of reported cases was fewer than the number reported for persons aged 55–59 years.
FIGURE 2. Number* of giardiasis case reports, by age group and year — United States, 2003–2005

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† Case reports decreased with increased age. For each 5-year subgroup, the number of reported cases was fewer than the number reported for persons aged 55–59 years.
Human acquire infection through consumption of contaminated water or food, or by fecal-oral route or by hands or fomites.

Contamination of water, food, or hands/fomites with infective cysts.

Trophozoites are also passed in stool but they do not survive in the environment.

Cyst

= Infective Stage

= Diagnostic Stage

Intestinal phase

Excytation occurs in the small intestine. Two trophozoites are released from each cysts.

Cyst

Trophozoite

The trophozoites multiply by longitudinal binary fission. They remain in the lumen of the proximal small bowel where they can be free or attached to the mucosa by a ventral sucking disk

Excytation occurs as the parasites transit towards the colon. Cysts are resistant forms and are responsible for transmission.

Source: CDC
What the authors see...
Parent cell

DNA replicates

2 daughter cells

4 daughter cells
Heterozygosity

• Allele sequence divergence
• Theoretically and experimentally higher among asexual organisms
• Cannot compensate for undesirable mutations
• Muller’s ratchet
Quandary:

No mating or meiosis reported

BUT
Karyogamy?

- karyon – “kernel”, gamos – “Marriage”

- Fusion of cell nuclei
  - Fungal
  - Fertilization
  - Bacterial Conjugation

- Chance of somatic homologous
What I see...
As a general conclusion, it may be suggested that the analysis of
Homologs of meiosis–specific genes

• Hop1 – recognizes chromatin states involved with DNA malfunctions
• DMC1a and b – Recombinase homologs, related to bacterial RecA
• Spol 1 – Type II DNA topoisomerase
### HOP1

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Where does it fit?

• Model of early meiotic development?

• Abandonment of meiosis?

• Truly meiotic?
Questions?