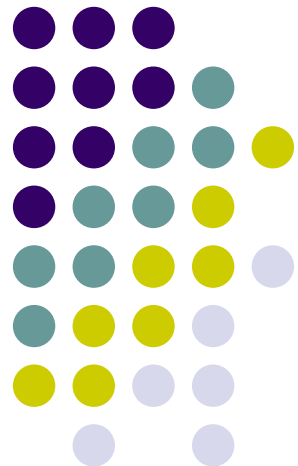
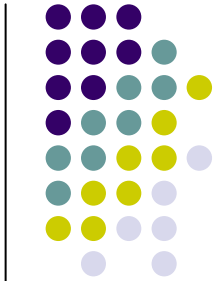
Anti-parasite Behaviour

G. A. Lozano

UNBC

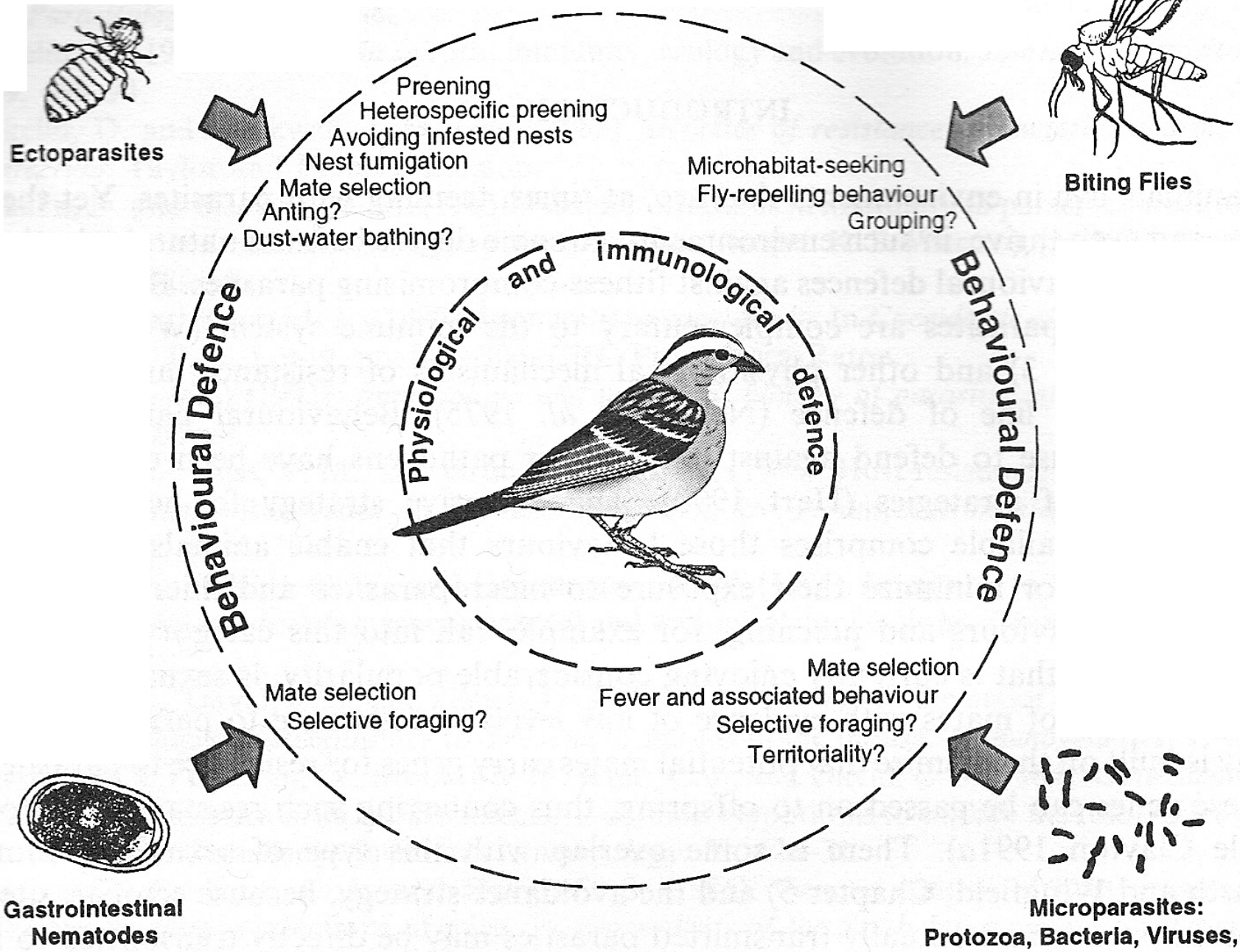


Parasites are ‘bad’ for the host..



- By definition, parasites are or can be detrimental to their hosts
- … and there are plenty of them.
- What can hosts do?
- Avoidance behaviours incur costs as well → cost of parasitism

- My bird bias


Ectoparasites
Preening
Heterospecific preening
Avoiding infested nests
Nest fumigation
Mate selection
Anting?
Dust-water bathing?
Behavioural Defence
Biting Flies
Microhabitat-seeking
Fly-repelling behaviour
Grouping?
Behavioural Defence
Physiological and immunological defence
Mate selection
Selective foraging?
Mate selection
Fever and associated behaviour
Selective foraging?
Territoriality?
GastroIntestinal Nematodes
Microparasites:
Protozoa, Bacteria, Viruses, Fungi

Avoiding Ectoparasites

- At the “nest”: mites, ticks, fleas, bugs, fly larvae
- Oddly, negative effects are sometimes hard to find.

- Avoiding heavily parasitized nests (reuse)
- Nest desertion
- Early fledging

Use of plant metabolites?

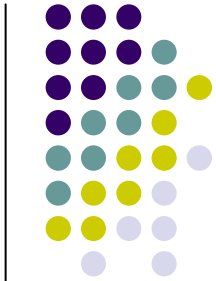
- In starlings, supposedly (Clark and Mason)
- Green vegetation is often used in nesting material.
- Supposedly for parasite control
- BUT the timing of its use, during pair formation only and only by males, indicates that it has probably more to do with mate attraction/selection.

Nests in Guano?

- Guano releases ammonia – anti-parasitic

- Are seabird nests placed in guano because of that?

Self- and Allogrooming



- Self grooming common in many species.
  - Head parasites

- “I scratch your back….”
- Allogrooming present in in social species
- E.g. unmated penguins are more parasitized
- Chimps – watching TV – dominance.

Self- and Allogrooming

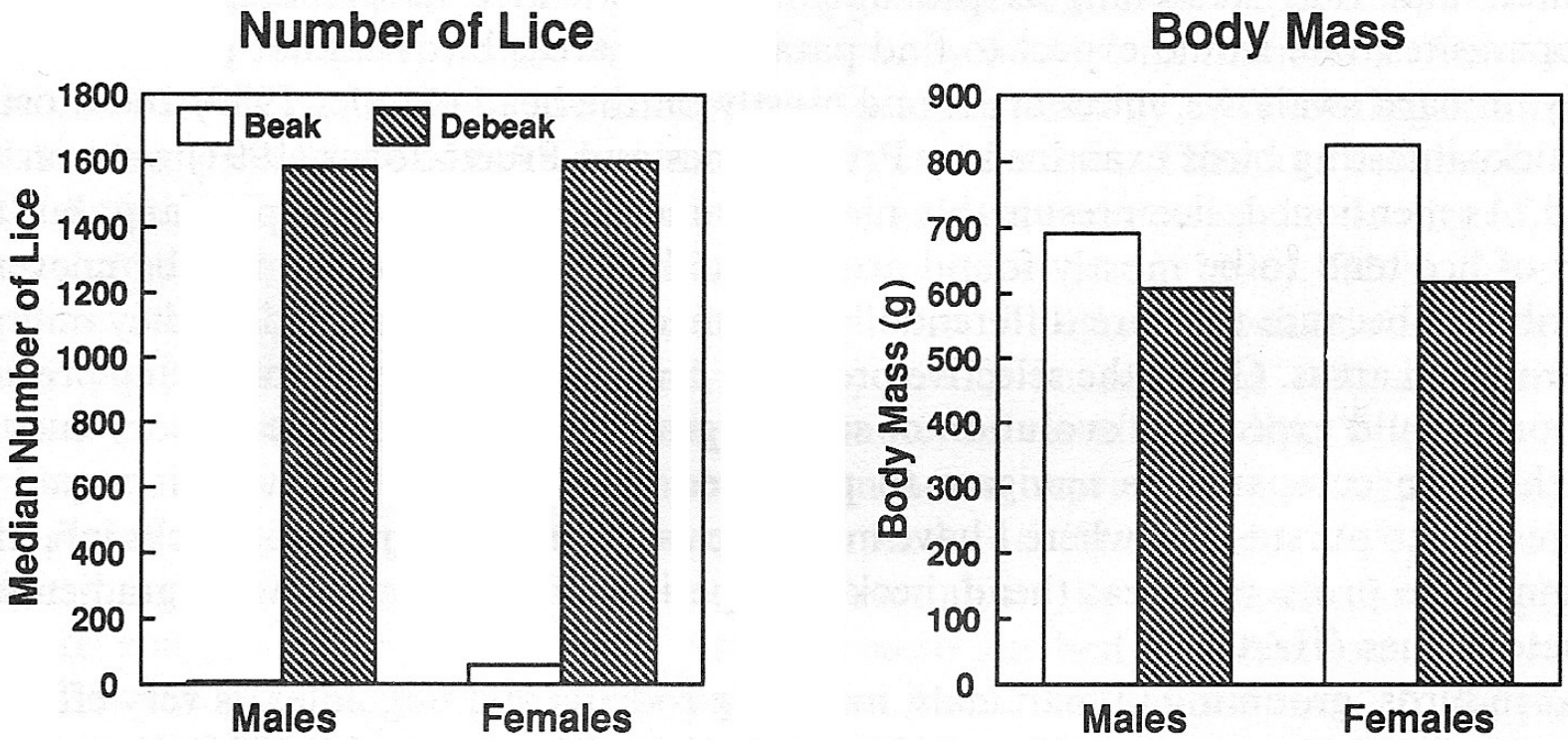


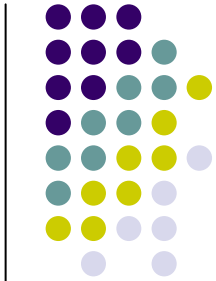
Fig. 4.2 Preening is very effective in removing ectoparasites, as shown in this experiment comparing debeaked chickens (1 cm removed from the upper beak) with control (beaked) chickens. Fifty lice were applied to the chickens at 31 days of age. The marked difference in louse load measured 33 days later was significant, as was the difference in body mass. (Data from Brown 1972.)

Heterospecific cleaning

Eastern Screech Owls and Blind snakes

- Perry normally killed before being brought to the nest
- Blind snakes, however, are not - released in the nest live.
- Eat adult arthropods and fly larvae.
- Too good of a story??

Other behaviours and effects



- Anting
- Fly repelling behaviour
- Sleeping positions (Hawaii)
- Selfish herd
- Microhabitat choice (Hawaii “head for the mountains!)
- Nest sanitation – fecal sac removal/eating
- Mating behaviour

Fly repelling

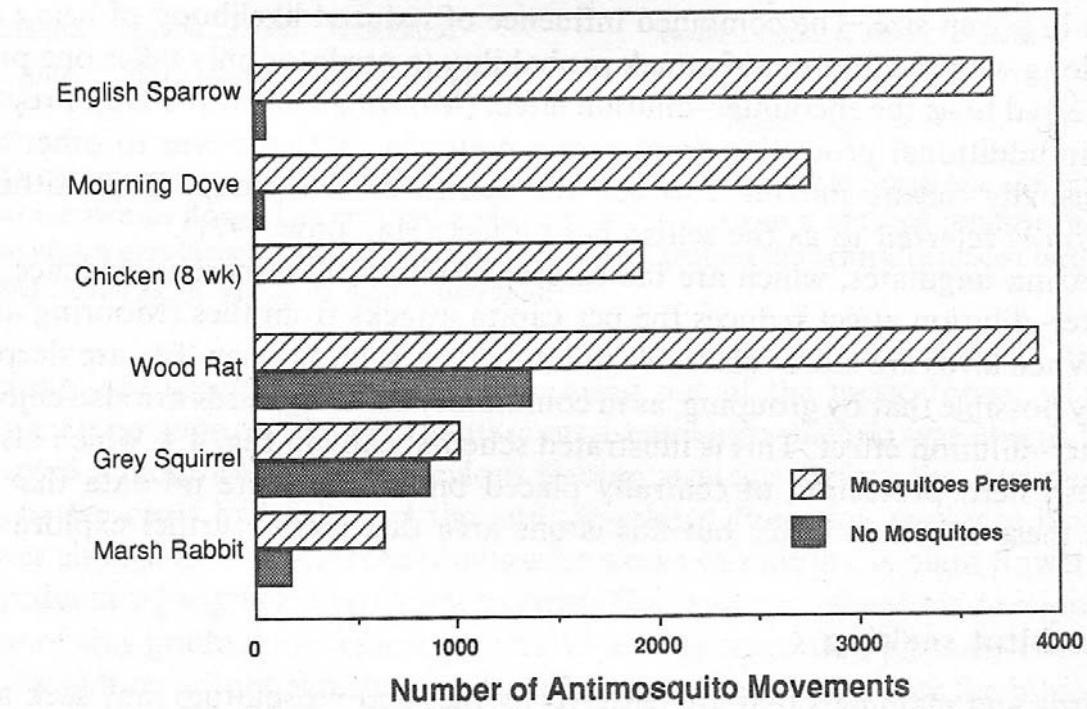
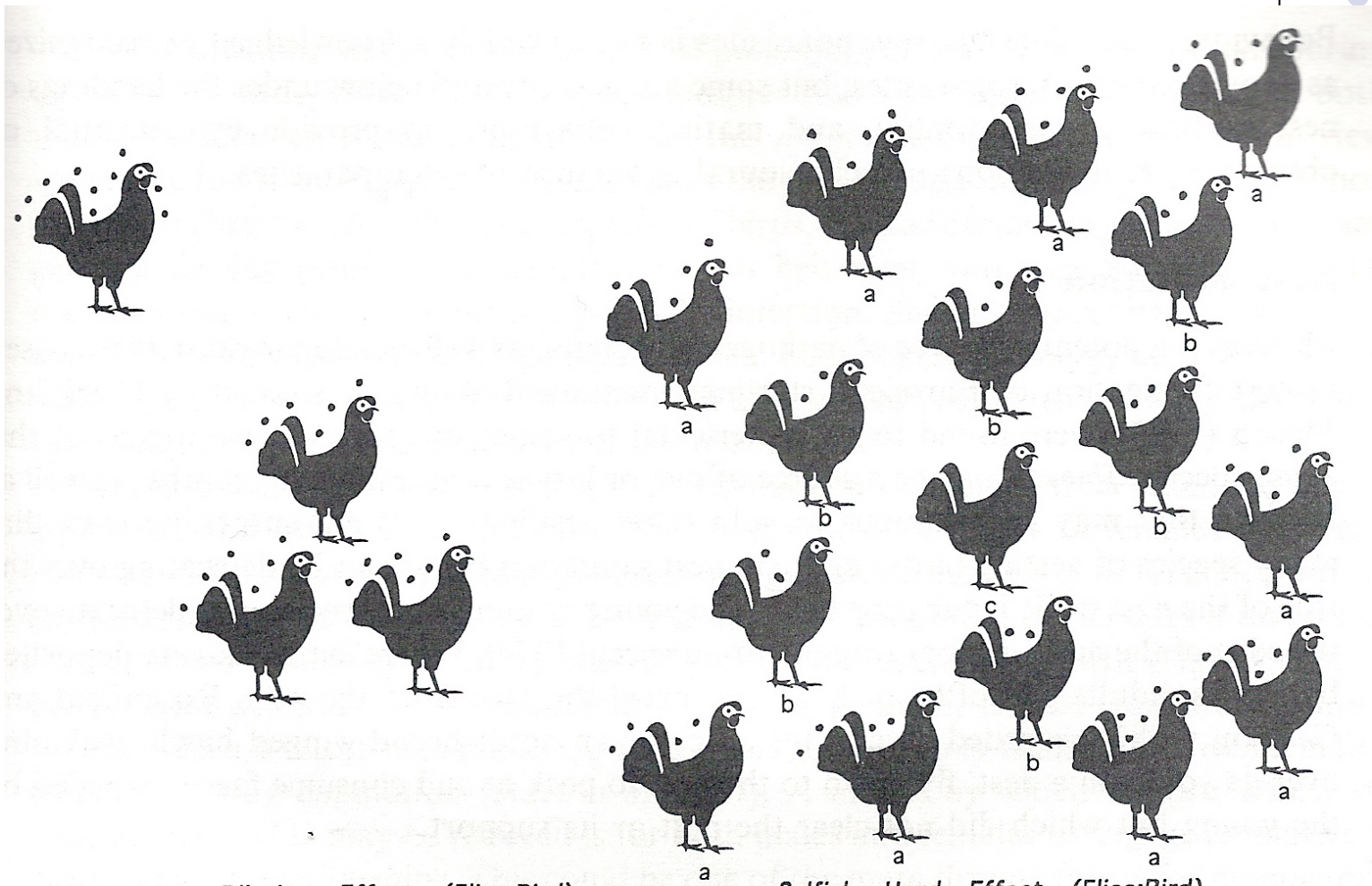


Fig. 4.3 The number of anti-mosquito movements (e.g. head shake, ear flip, face rub, foot stamp, tail bite, or body shake) increases when animals are exposed to mosquitoes. This graph shows the total number of anti-mosquito movements per hour for different species and when 300 mosquitoes (*Culex nigripalpus*) were released into a cage (8 × 8 × 8 ft) with the animal. (From Edman *et al.* 1974.)

Selfish heard



Encounter Dilution Effect (Flies:Bird)

Single Bird	Small Group	Large Group
10:1	6:1	3:1

Selfish Herd Effect (Flies:Bird)

Outer ring (a) 4:1
Middle ring (b) 2:1
Center ring (c) 0:1

Mating behaviour

- One generation is all it takes!
- Avoiding infected partners
  - Cloacal exam in birds
  - Urogenital inspection in mammals
- Pre- and post-copulatory cleansing

- Don’t’ shoot the messenger!

Effects on Foraging Behaviour – why foraging?

Prophylactic	**Therapeutic**
Risk of parasitism	Actual presence
infective stage	established stage
seasonal changes?	individual changes
possibly genetic	learned
interpop diffs	interindivid. diffs
part of the usual diet	specifically to deal with illness

Prophylactic

- Geophagia in primates
  - Macaques, gorillas, chimps
  - Antidiarrheal clays – only mineral analyses so far
- Antischistosomal drugs use in baboons
  - 2 habitats fast upstream, slow downstream
  - IH absent where??
  - Baboon diet differed up/down
  - Shrub balanites – antischitosomal?? NO

…prophylactic

- Antibacteral foliage in starlings
  - Probably not
- Anting and fur rubbing
  - Birds:Ants, centipedes, lime, mothballs
  - Mammals: citrous fruits, resins, etc
  - Much annecdotal evidence, seems to work

Therapeutic

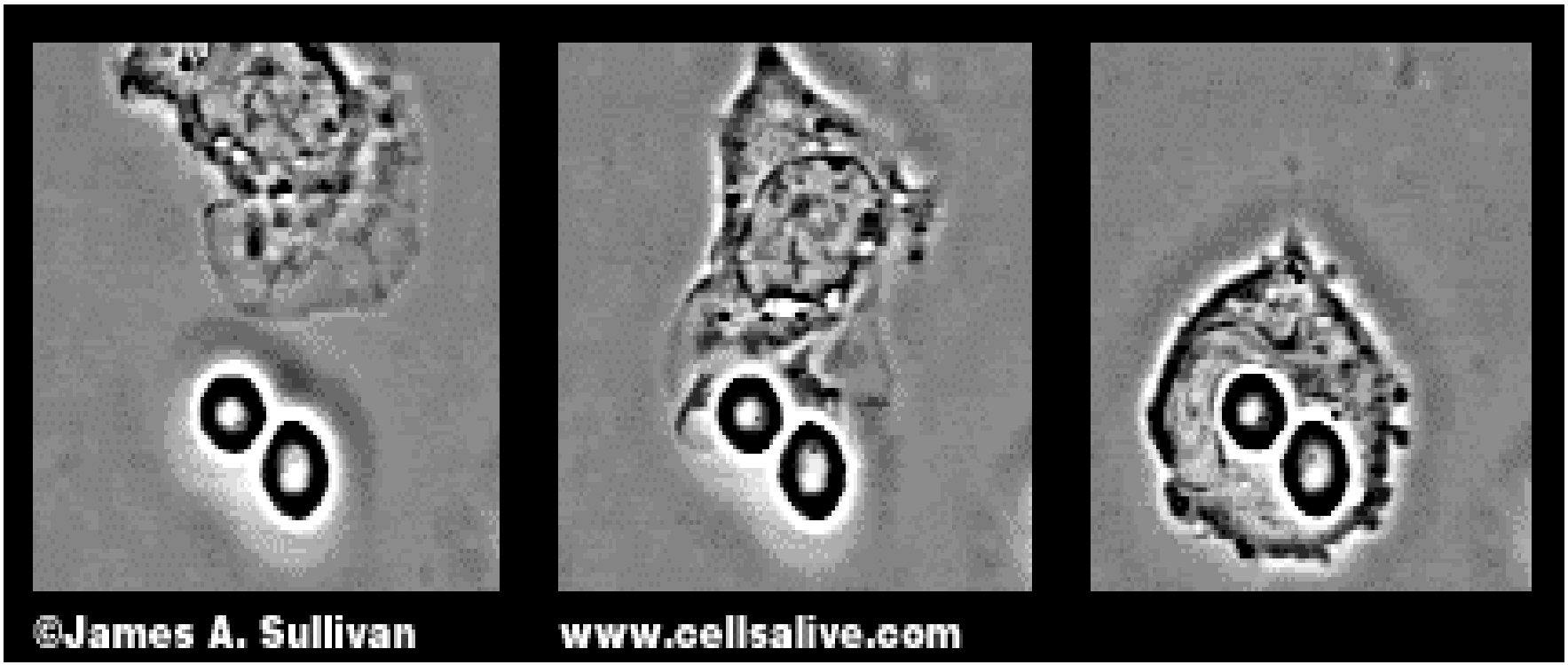
- Supposedly occurs in chimpanzees, but very difficult to clearly demonstrate.
- Chemical or physical removal of intestinal parasites.
- Manipulative experiments unethical.
- Follow and observe, but difficult to make a definite connection.

…..therapeutic self-medication

- Learning mechanisms (individual or social) required would be extremely complex and have not been demonstrated.

- The bottom line… really interesting story, but it seems unlikely.

Next → when parasites get past behavioural defenses



Human macrophage engulfing the fungus *Candida albicans*.