Ovary dissection

Fig. 48. Internal anatomy of female mosquito,

(1) Gut: eb = cardiac sphincter  S = stomach (mid-gut)
    MT = Malpighian tubes  P = small intestine
    AP = rectal papillae
(2) Longitudinal section through body:  CG = cerebral ganglion
    SP = salivary pump  PH = pharynx  Sgl = salivary glands
    DV = dorsal diverticula  GT = thoracic ganglia
    GV = abdominal ganglia  VV = crop  MT = Malpighian tubes
    OV = ovary  H = heart  A = anus  C = cercus
(3) Female reproductive system:  OW = ovary  Ovid. = oviduct
    A = ampullae  CO = common oviduct  S = spermatheca
    AG = accessory gland  Vag. = vagina
(4) Salivary gland:  ML = middle lobe  LL = lateral lobe.
FIG. 5. FORMATION OF DILATATIONS IN OVARIOLES

1-5 Development of the follicle
6 Ovariole after the first ovulation: the wall of the ovariole is distended in the shape of a sac
7-9 Contraction of the sac and formation of the dilatation
10-11 Beginning and end of the development of the follicle during the second cycle
12 Ovariole after the second ovulation
13 Formation of the second dilatation
14-15 Ovarioles of females after the second and third gonotrophic cycle
   I The first developing follicle and the place left after its discharge
   II The second follicle and the place left after its discharge
   III The third follicle and the place left after its discharge
   IV The fourth developing follicle
   a Terminal pedicle of the ovariole
   b The intima dilated after the passage of the mature egg
   c Growth zone
Fig. 9. Ovariolar forms with dilatations observed during dissections of Cx. annulirostris 1- to 3-parous females. (a) In situ ovariole with one clear dilatation (arrow). (b) Detached ovariole with one clear dilatation (arrow). (c) In situ ovariole with one dilatation (arrow) in the process of being formed, probably by the degeneration of a1Va follicle (as indicated by the presence of yellow, light refracting, yolk). (d) Detached ovariole with three dilatations (arrows) from a 3-parous female. (e) Detached ovariole with four dilatations (arrows) observed from a 3-parous female. (f) Detached ovariole with degenerated primary follicle (white arrow) and two dilatations (black arrows). Scale bars 0.1 mm.
“Stage I, egg follicle round, yolk granules absent; Stage II, egg follicle oval, yolk granules present; Stage II-early, a few fine granules of yolk around the nucleus of the ovum; Stage II-mid, yolk granules easily visible under low power; Stage II-late, yolk granules very abundant occupying about half the follicle; Stage III, yolk occupying about three-quarters of the follicle; Stage IV, egg follicle sausage-shaped; Stage V, ova fully formed with well-developed floats.”

A Blood-feeding stages

Empty  Fed  Half-gravid  Gravid
Human Landing Catch
(or Night Biting Collection)

- Gold standard of mosquito collection
- Ethical and logistical issues
Pyrethrum Spray Catch
Resting Traps

Resting boxes

Resting pots
CDC light traps
Exit Traps
Collection Methods and Estimates

- Pyrethrum Spray Collection – abdominal appearance, sporozoite rate & density
- Exit Trap Collection – Abdominal appearance & density
- Night Biting Collection – Christophers’ stages, Detinova, sporozoite rate & density
- Outdoor Resting Collection – Blood meal, abdominal appearance & density
Vectorial Capacity

- $C = \frac{(ma \times a \times p^n \times b)}{(-\ln p)}$
  - $ma =$ human biting rate (number of vectors feeding on a human per day)
  - $a =$ prob. a vector feeds on a host in 1 day
  - $b =$ vector competence (proportion ingesting infectious meal that become infective)
  - $p =$ prob. the vector will survive 1 day
  - $n =$ duration of the Extrinsic Incubation Period (EIP) in days
  - $(1/\ln p) =$ duration of the vector’s life, in days, after surviving the EIP
Applied to the Garki Project

\[ C = \frac{(ma \times a \times p^n \times b)}{(-\ln \ p)} \]

Man biting rate
(averaged between indoors and outdoors NBCs)
Applied to the Garki Project

\[ C = \frac{(ma \times a \times p^n \times b)}{(-\ln p)} \]

Man biting rate (averaged between indoors and outdoors NBCs)

(HBI as determined by PSC collections) / (Interval between blood meals)
Applied to the Garki Project

\[ C = \frac{(ma \times a \times p^n \times b)}{-\ln p} \]

Man biting rate (averaged between indoors and outdoors NBCs)

0.819 probability of survival through 1 day, corresponds to about 5 days

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EIP of 10 days from literature
Assumptions of Vectorial Capacity in Garki

- Survival of is not affected by age
- Survival is not affected by infection
- Vector and vertebrate populations mix at random
- Homogeneity in susceptibility