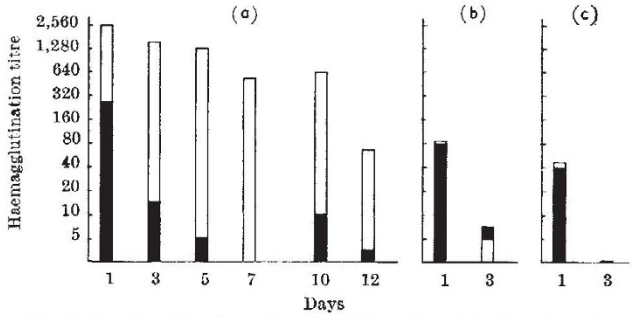

Fig. 2. Results of *in vitro* cultivation of the (*a*) popliteal lymph node, (*b*) uterus and (*c*) vagina of rabbit No. 9 immunized systemically with diphtheria toxoid. □, Geometric mean antibody titre after *in vitro* cultivation; ■, geometric mean antibody titre from tubes containing an inhibitor to antibody synthesis.

these rabbits, the uterus and vagina contained considerable performed, adsorbed antibody that washed out after several days, but these same tissues demonstrated no capacity for synthesis (Fig. 2*b*, *c*).

In the three rabbits which received intrauterine injections of diphtheria toxoid, the uterus failed to produce antibodies *in vitro*. Table 1 summarizes the results of *in vitro* antibody production in the various tissues examined from the immunized rabbits.

Local antibody production by the vagina has been suggested by Kerr and Robertson[4,9], who found vaginal antibodies against *Trichomonas foetus* in infected heifers, and showed that these antibodies were probably responsible for the disappearance of the organism from the vagina after oestrus. Investigations on cattle with vibriosis[10,11], trichomoniasis[2], and *Brucella abortus*[3], and in humans with typhoid paratyphoid vaccine[5] have demonstrated an independence of vaginal and serum antibody titres suggesting local antibody production. The human vagina is histologically described as containing numerous lymphocytes and occasionally lymph nodules[12]. Microscopic examination of the normal rabbit vagina also reveals an abundance of lymphoid elements. The present report provides some direct evidence in the rabbit for local antibody production by the vagina.

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GENETICS

Loss of Chromosomes and Nondisjunction induced by Caffeine in *Drosophila*

THE mutagenic and chromosomal aberration activity of caffeine (1,3,7-trimethylxanthine) has been demonstrated in human tissue cultures[1], bacteria[2], *Ophiostoma*[3], and onion root tips[4]. In mice the data are indeterminate[5,6] and this is also the case in *Drosophila* because Andrew[7] reported mutagenic effect of caffeine although Yanders and Seaton[8] reported a lack of mutagenicity.

In an attempt to ascertain the effect of caffeine on the breakage and loss of chromosomes in *Drosophila*, the *XO* method was used. Males containing $XC^2\,yB$, a ring chromosome marked with yellow body and Bar eye which is readily lost as a result of radiation injury[9], and a *Y* chromosome possessing the y^+ allele, were used. The females contained an attached *X* chromosome with yellow body and forked bristles (*y f*). They were reared from egg to adult on cornmeal, dried brewers yeast, sucrose and agar media to which caffeine was added so that 0·1225 per cent concentration was obtained. This was the maximum amount of caffeine that would permit the *Drosophila* to complete the life cycle. The males were collected soon after emergence from the pupae and mated to *y w f* females (yellow body, white eyes, forked bristles). The expected offspring from this mating are yellow Bar females and white forked males. The appearance of exceptional *y w f* males indicated the loss of the ring *X* chromosome or the *Y*, or y^+ portion in spermatogenesis of the treated male. Exceptional females were those that were wild body colour and Bar eyes. These result from the presence of both *X* and *Y* chromosomes from the male by nondisjunction in one spermatozoa that fertilized the *y w f* egg.

Table 1. EFFECT OF EATING $XC^2\,yB/sc^8\,y^+$ MALES ON 0·1225 PER CENT CAFFEINE WITH RESPECT TO NONDISJUNCTION AND CHROMOSOME LOSS

$XC^2\,yB/sc^8\,y^+ \times y\,w$

	Caffeine exposed	Control
yB ♀	2156	3737
+wf ♂	2014	3040
y wf ♂	43 (1·015 per cent)	44 (0·644 per cent)
+B ♀	25 (0·589 per cent)	3 (0·0439 per cent)
Total	4238	6824

The data presented in Table 1 indicated that there was a significant difference ($\chi^2 = 4{\cdot}583$) with respect to *XO* males produced by caffeine fed males compared with the *XO* offspring from the control males. The breakage of chromosomes by caffeine accounts for increase in *XO* males; however, the large increase in the nondisjunction female (*XXY*) was not expected. Kihlman and Levan reported that one of the effects of using caffeine at more than 0·04 per cent resulted in stickiness of chromosomes in *Allium cepa* and the clumping of chromosomes at metaphase. This stickiness induced by caffeine explains the higher percentage of exceptional *XXY* females from treated males. Several aspects of the problem of nondisjunction by caffeine need to be examined. At what stage in larval development does the caffeine affect the spermatogenesis? Does the increase in *XO* males result from nondisjunction rather than from chromosome breakage?

It is difficult at this time to correlate the results presented here with problems of nondisjunction in man.

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