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Cytological Effects of Some Contraceptives

By Hoda Hakeem

Faculty College for Girls - Ein Shams University

Introduction

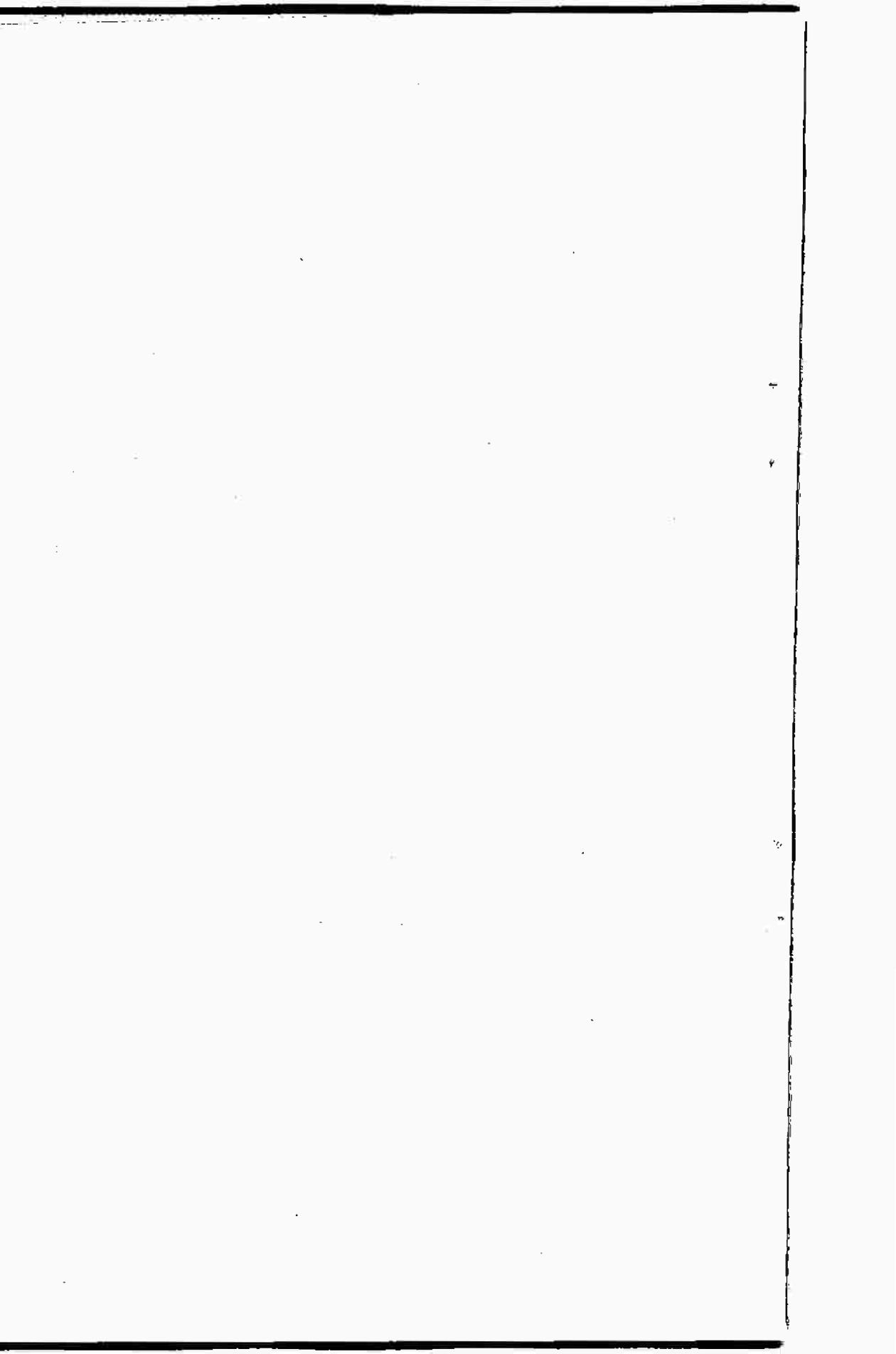
The number of chemical compounds used as contraceptives has been continually increasing in recent years. The cytological effects of some of these drugs are now being of interest; Hakeem and Amer (1966), Kabarity and Khodary (1967). Nowadays other contraceptives are at hand, it seems therefore necessary to continue investigation of their cytological effects. Five new types of contraceptive tablets are now available and widely used in Egypt. Ovulen (Kahera c.) Ovral (Nile. C.) Gyne anovlar, Anovlar I and Primovlar, (Cid.C.).

The present work represents a comparative study on the effect of these five contraceptives on the meiosis of Vicia faba

Material and Methods

Vicia faba plants (var. Giza I) were treated with aqueous solutions of contraceptive tablets. Two types of treatment were conducted :

- a) Direct treatment of flower buds for 3 hours using a moisted piece of cotton.



The percentage of abnormalities decreased gradually as we approached the stages of the 2nd division, (Table II). Spraying with Ovālen and Ovrā did not follow this rule.

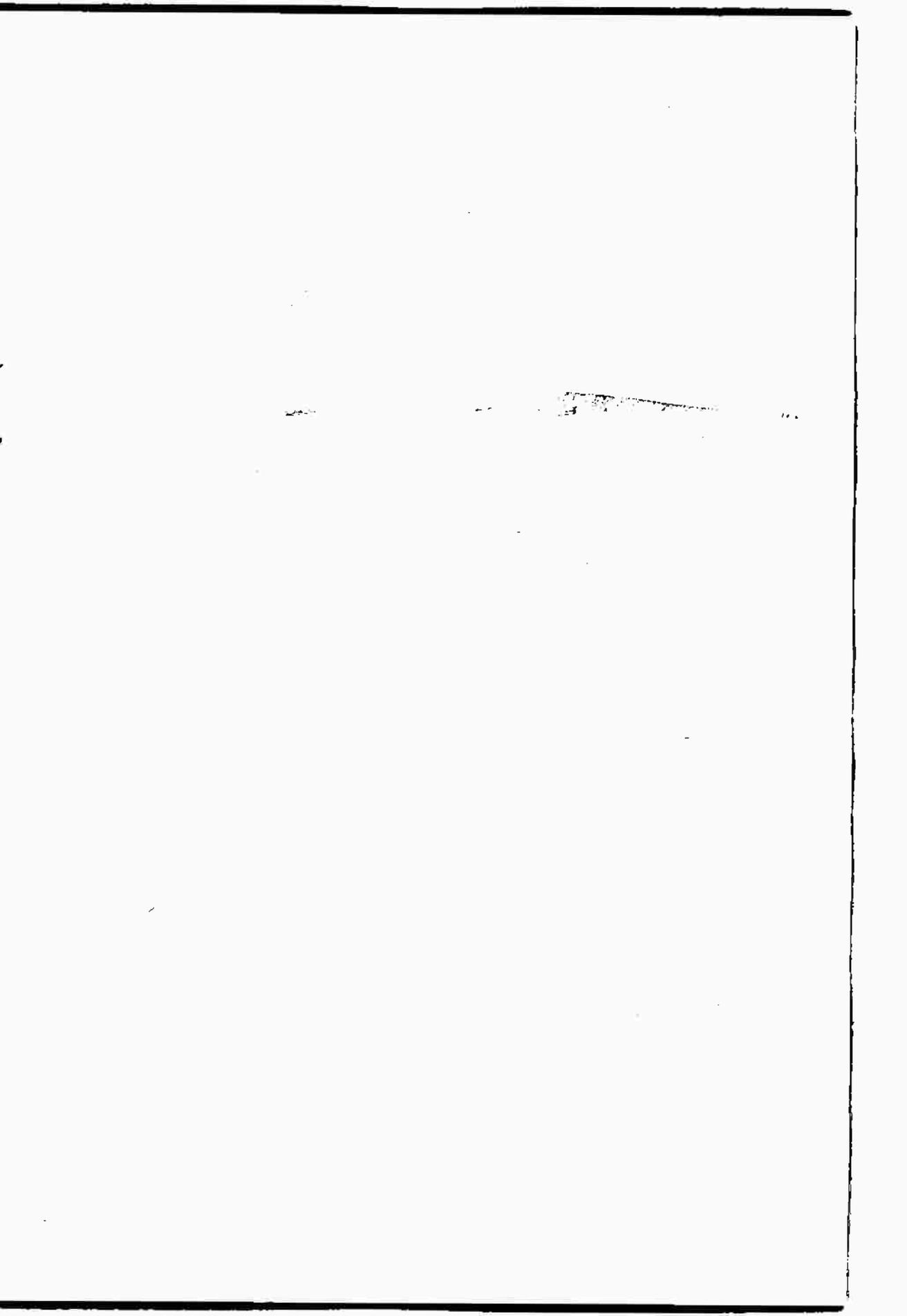
All the five contraceptives gave nearly the same types of abnormalities. Stickiness, sticky bridges and lagging chromosomes were the most common configurations (Table I). The highest degrees of stickiness resulted in a clumped mass in the middle of the cell (Fig 6). In lighter degrees of stickiness the sticky ends of bivalents resulted in various configurations such as chains and rings of bivalents (Fig 1,2,3,4,5) Sax (1941) attributed stickiness of x-rayed chromosomes to excess charge of nucleic acid on the chromosomes. The phenomenon of stickiness which is usually induced by many chemical and physical agents in meiotic chromosomes was observed by many authors. Ohno (1960) reported sticky meiotic chromosomes after treating *Allium* with extracts from noxious plants, Hakeem and Amer (1966) treating *Vicia* buds with saturated contraceptive solutions (Anovlar, Conovid, and Lyndiol) reported also a high degree at sticky meiotic chromosomes.

Sticky bridges and bridge fragment configurations were observed in both types of treatments (Fig2). All applied contraceptives gave nearly the same percentage of sticky bridges

which are the result of stickiness, such configurations were few in second division phases after treatment with Anovlar I, Gyne Anovlar and prymovlar they were common after Ovulen and Ovlar treatment.

Lagging chromosomes or bivalents (Fig 2) were also more common in the first phases of divisions than the second ones. This type of ^baberration was induced by all contraceptives in the two types of treatments with nearly the same percentages (Table I) such ^baberration may be attributed to the hinderance of separation of bivalents at the end of metaphases due to stickiness. Lagging bivalents appear to be a result of clumping of the other bivalents together. The phenomenon of lagging was reported by many authors, Ohno and Tanihuzi (1960), Hussein and Hakeem (1960) and Hakeem and Shehab (1970). Barthelmess (1957) attributed such phenomenon, in mitosis, to hinderance of prometaphase movement of chromosomes accompanied by adhesion of the centromeres to the adjacent inner surface of the plasma.

Other observed phenomenon of less importance such as fragments and cytomixes were recorded. Fragments and paired fragments (Fig 7) were few and only observed in Prymovalar, vral and Ovulen. Cytomixes was reported only in Gyne anovlar,



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Summary

Meiotic effects of five contraceptives; namely ^AChovlar I, Gyne Anovlar I, Gyne anovlar, Prymovlar, Ovulen and Ovral were studied on *Vicia faba*. The most common abnormalities were, stickiness, sticky bridges and lagging chromosomes. Spraying with ovral and Ovulen resulted in more toxicity giving higher percentages of abnormalities and affecting pollen viability. No traces of spindle disturbances were reported.

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Table I
Number and percentages of total abnormalities
and different types of abnormalities

Exp. Agent	Type of treat.	No. P.M.Cs	abn. P.M.Cs	%	Percentage of different types of abn.					
					Stalk	Long	Brd	Frag	Spidi	Cyrom
Control	Direct Spray	1853	37	1.9	100	-	-	-	-	-
		1981	41	2.09	100	-	-	-	-	-
Anovlar I	D S	1920	148	7.7	76	14	10	-	-	-
		1725	214	12.4	71	16	11	-	-	-
Gyne anovlar	D S	2045	157	7.6	78	13	9	-	-	-
		1888	182	10.8	75	13	10	2	-	-
Prymovlar	D S	1966	167	8.4	73	13	11	-	-	3
		2120	224	10.5	76	14	8	-	-	2
Ovral	D S	1870	194	10.3	65	16	12	5	-	2
		1737	289	16.6	70	12	10	4	-	5
Ovulen	D S	1590	139	8.7	69	17	8	3	-	3
		1913	219	11.4	70	11	10	5	1	3

Table II
 Number and percentage of abnormalities in different meiotic phases and percentage of pollen viability after direct treatment and spraying flower buds with contraceptives

Exp. agent	Type of treat.	1st ana-metaphase			2nd metaphase			2nd ana-metaphase			% pollen viabil.			
		No. P.M. Cs.	abn. P.M. Cs	%	No. P.M. Cs	abn. P.M. Cs	%	No. P.M. Cs	abn. P.M. Cs	%				
Control	Direct Spray	608 650	17 21	2.7 3.2	493 533	-	-	513 548	11 23	2.1 4.2	242 250	-	-	98.1 97.3
Abovlar	D S	809 750	78 121	9.6 16.1	317 241	33 39	10.3 13.06	559 432	34 35	6.09 8.1	235 262	10 19	4.2 7.2	97.6 96.7
Oyne Abovlar	D S	911 711	93 94	10.2 13.2	450 381	42 46	9.3 12.06	314 519	25 31	7.9 5.9	370 277	12 11	3.2 3.9	95.9 95.4
Prymovlar	D S	853 927	87 111	10.1 11.9	395 471	39 67	9.8 14.2	416 583	27 38	6.7 6.5	302 139	14 8	4.6 5.7	96.2 95.9
Ovral	D S	822 631	102 135	12.4 22.6	501 411	56 63	11.1 15.3	310 573	27 76	8.7 13.2	237 122	9 15	3.7 12.2	94.3 91.5
Ovulen	D S	740 644	76 109	10.2 12.9	219 523	16 58	7.2 11.04	464 399	31 35	6.7 8.7	167 147	16 17	9.5 11.5	94.9 93.4

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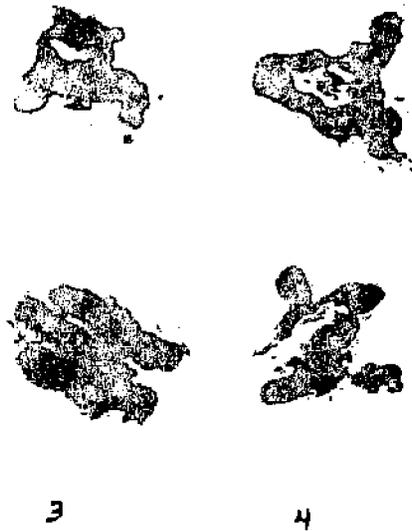


Fig. 1-4 Photo-micrographs of meiosis in Vicia faba as a result of direct treatment with Anovlar Fig 1, Sticky metaphase; Fig 2, Sticky metaphase with an attached fragment; Fig 3, Chains of bivalents; Fig 4, Early metaphase showing sticky bivalents with stretched ends. X.

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Fig. 5. Group of P.M.C. representing normal 1st metaphase-polar view (right), 1st metaphase with chain of bivalents (left), and different types of sticky late second metaphase (middle), as a result of spraying with ovlar.

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Fig. 6.

Fig. 7.

Clumped 2nds metaphase (Fig.6) and diakinesis with paired fragment (Fig 7) resulting from treatment with ovulen.