OP-032 [Apitherapy]
The Effect Of Royal Jelly On Female Reproductive Health In Rats

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Royal jelly (RJ) is a complementary dietary supplement widely prescribed by traditional medicine specialists for the treatment of infertility. The aim of the present study was to evaluate the effects of RJ on a set of reproductive parameters in both immature and mature female rats. Immature (30-day-old) and mature (60-day-old) Sprague-Dawley female rats were divided into four groups (n=7) and administered 200, 300, and 400 mg/kg of RJ for 75 and 45 days, respectively. During the feeding period, weight and height were measured, and cardiac blood samples were collected. At the end of the feeding period, the rats were sacrificed, and ovarian and uterine tissues were obtained for histological examination. Serum levels of ovarian hormones, nitric oxide (NO), and ferric reducing antioxidant power (FRAP) were analyzed, and the ratios of ovarian and uterine weight to body weight were calculated. A significant difference was observed in estradiol (E2) levels among the mature groups ($p < 0.05$). Additionally, a significant difference was found in anti-Müllerian hormone (AMH) levels among the immature groups (IM, IM300, and IM400). While the difference in ovarian index was statistically significant ($p < 0.05$), no significant difference was found for the uterine index ($p > 0.05$). A significant difference was noted for preantral follicle index (PF I) among the mature groups. However, no significant differences were found in primary follicle (PF), secondary follicle (SF), antral follicle (AF), and corpus luteum (CL) counts ($p > 0.05$). A significant difference was observed between the mature and immature groups for the glutathione peroxidase (GSH-Px) antioxidant parameter in both ovarian and uterine tissues ($p < 0.05$). The effectiveness of royal jelly in hormone regulation and its antioxidant effects can be attributed to its bioactive components. The findings suggest that RJ, which has a high biological value, positively influences reproductive health by promoting folliculogenesis and balancing ovarian hormones depending on the menstrual cycle. Furthermore, the antioxidant properties of RJ may help mitigate oxidative stress in women during preconception. This effect is likely due to its ability to increase glutathione levels and inhibit lipid peroxidation, a key marker of oxidative stress.

DÜZCE UNIVERSITY

DAGEM -BEEKEEPING RESEARCH DEVELOPMENT AND APPLICATION CENTER

THE EFFECT OF ROYAL JELLY ON FEMALE REPRODUCTIVE HEALTH IN RATS

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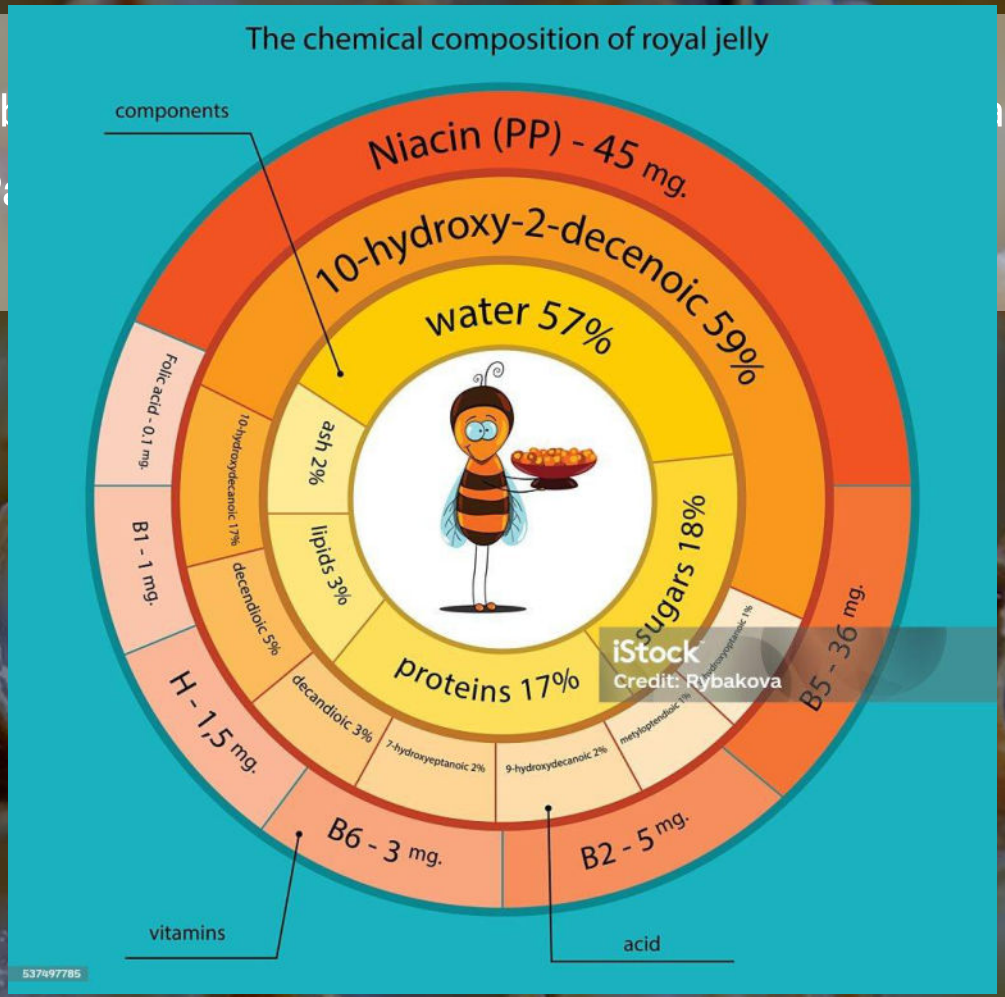
APIMONDIA SCANDINAVIA 2025
SWEDEN | DENMARK | NORWAY
23-27 SEPTEMBER
COPENHAGEN

Royal jelly is a l… …l glands of young worker bees (Pa…

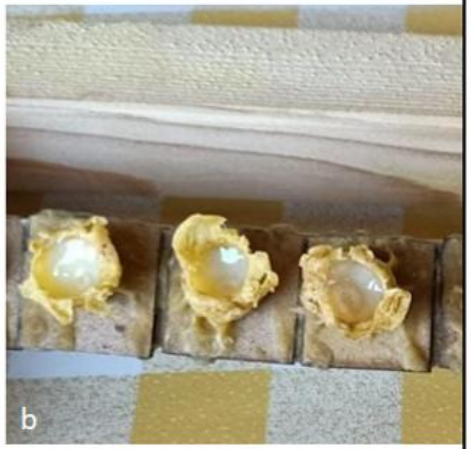


- The queen bee have fertility and longer lifespan than worker bees due to royal jelly.
- So, Royal jelly is thought to have an effect on fertility.
- Therefore, women, especially those with infertility problems and who cannot pregnancy, prefer to use royal jelly.
- However there are no more detailed research about royal jelly-fertility and reproductive physiology
- Therefore It was aimed to make detailed investigation on the effect of royal jelly.

The aim of the study

To investigate the effect of royal jelly on woman fertility

a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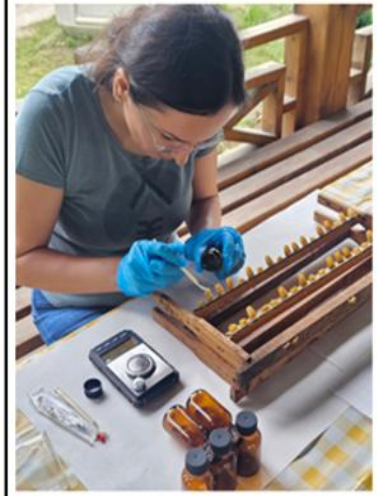
c

d



c

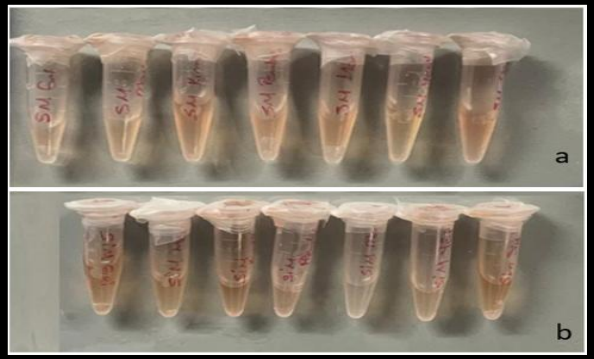
Experimental Design

	Group No	Group Code	Group Name	Dose	Animal Number
Immature	1			tment and	n=7
	2				n=7
	3				n=7
	4				n=7
Mature	5			ent and	n=7
	6				n=7
	7				n=7
	8				n=7

Experimental Design

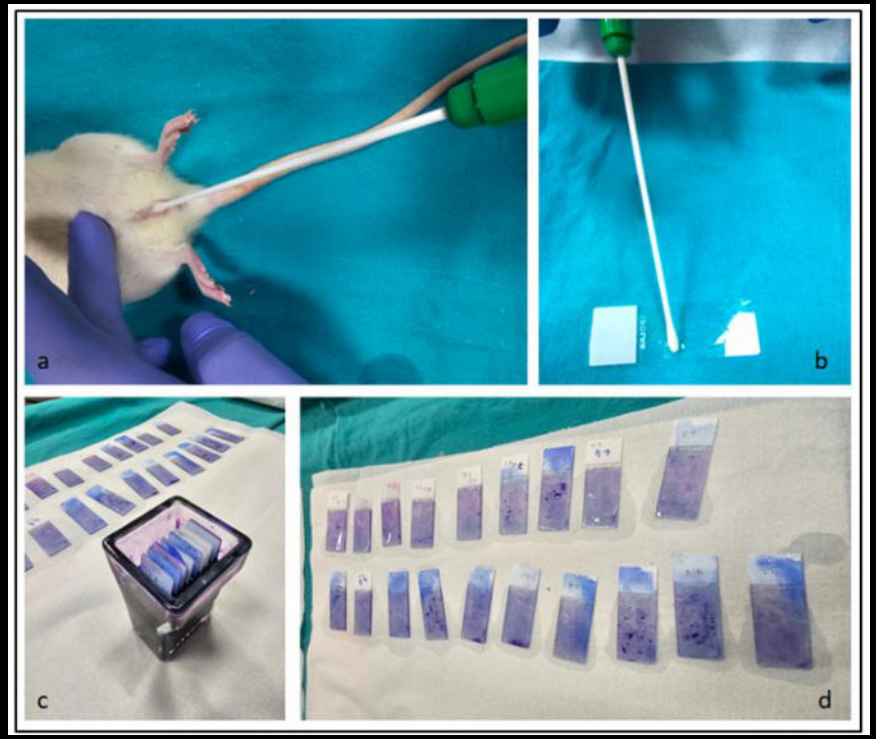
Immature Rats	**Feeding Day**	**0. day**	**15.day**	**30.day**	**45.day**	**60.day**	**75.day**
	Rats' age	IM (30 days age)	IM (45 days age)	IM (60 days age)	IM (75 days age)	IM (90 days age)	IM (105 days age)
Mature Rats	Rats' age			M (60 days age)	M (75 days age)	M (90 days age)	M (105 days age)
	Feeding Day			**0. day**	**15.day**	**30.day**	**45.day**

Hormone Tests

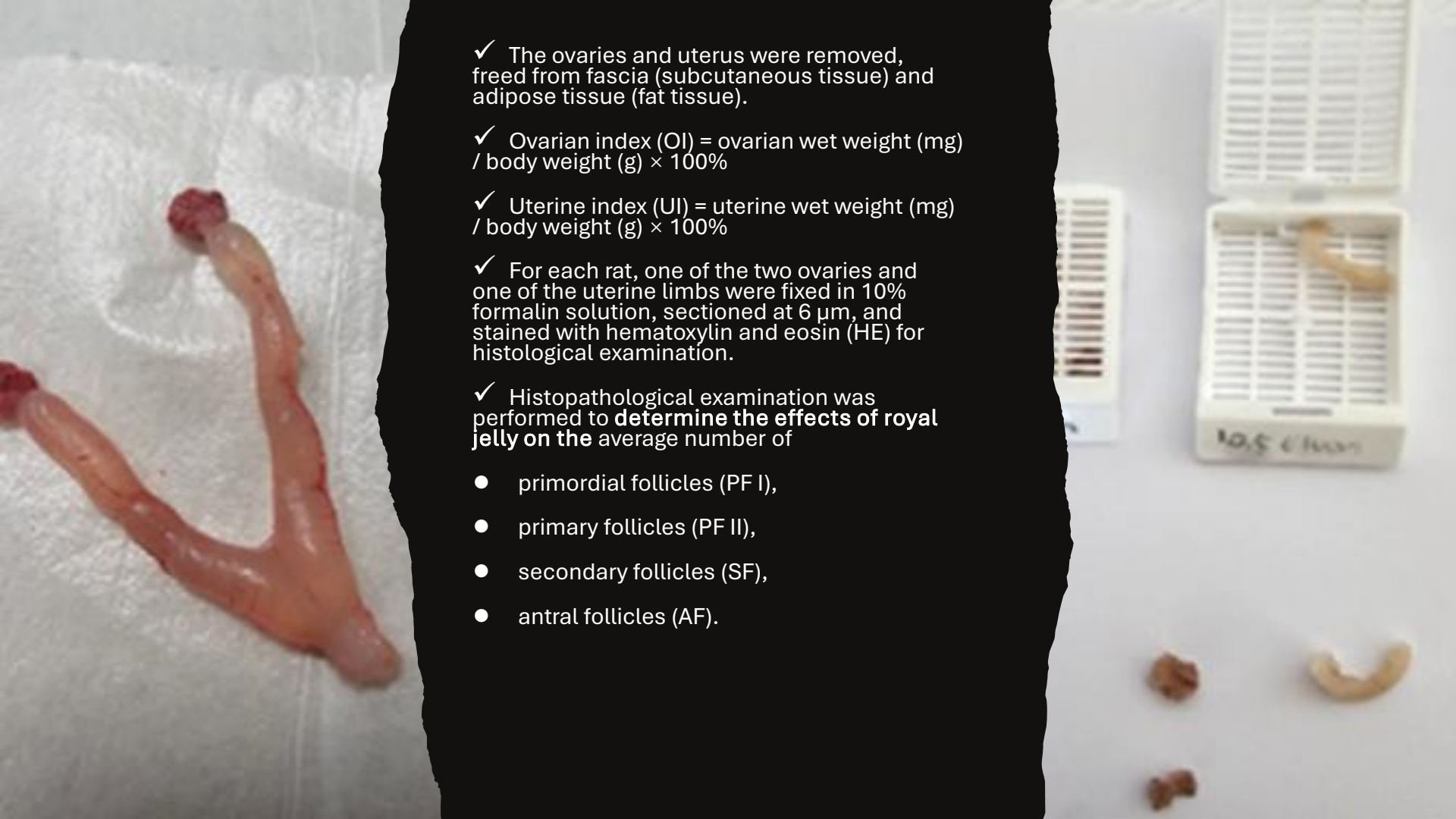


- Mature rats; 105th day blood sample
- Immature rats; 105th day blood sample
- Hormones; E2, P, FSH, AMH, GH

Estrus cycle examination



- Vaginal smear samples were collected after 75 days of feeding for immature rats and 45 days for mature rats.
- The proestrus, estrus, metaestrus, and diestrus phases were examined under a light microscope.



✓ The ovaries and uterus were removed, freed from fascia (subcutaneous tissue) and adipose tissue (fat tissue).

✓ Ovarian index (OI) = ovarian wet weight (mg) / body weight (g) × 100%

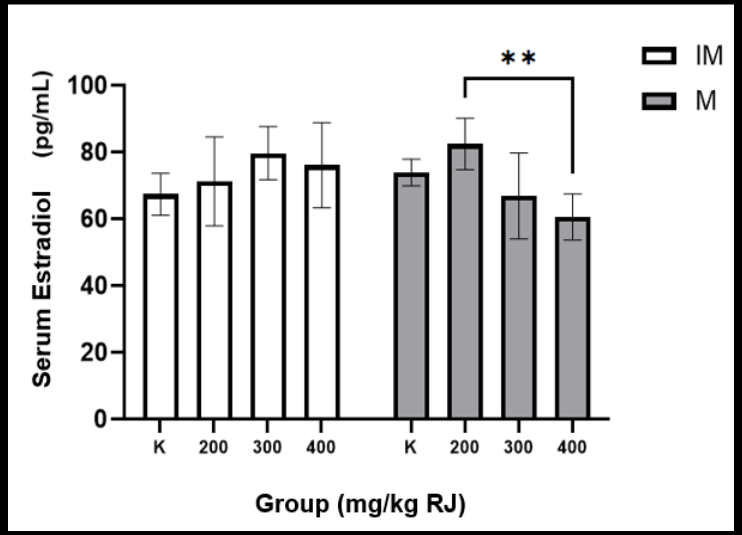
✓ Uterine index (UI) = uterine wet weight (mg) / body weight (g) × 100%

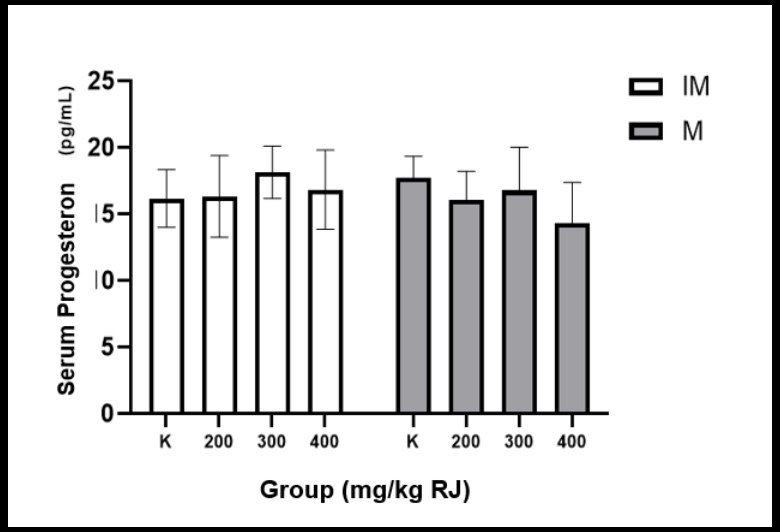
✓ For each rat, one of the two ovaries and one of the uterine limbs were fixed in 10% formalin solution, sectioned at 6 μm, and stained with hematoxylin and eosin (HE) for histological examination.

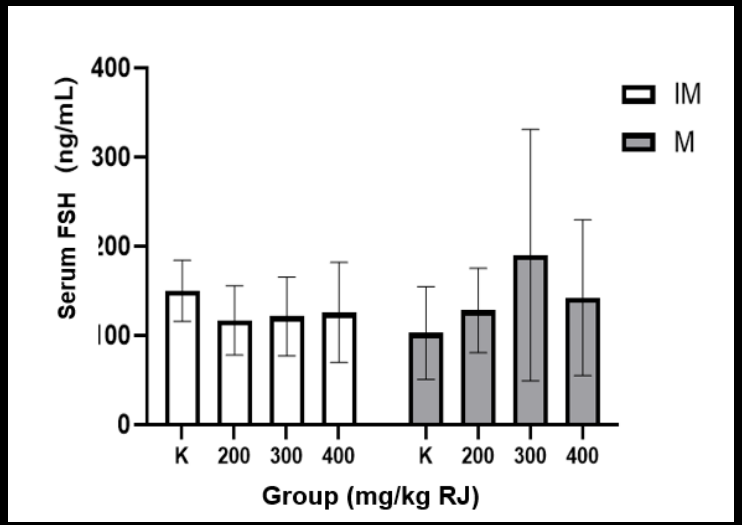
✓ Histopathological examination was performed to **determine the effects of royal jelly on the** average number of

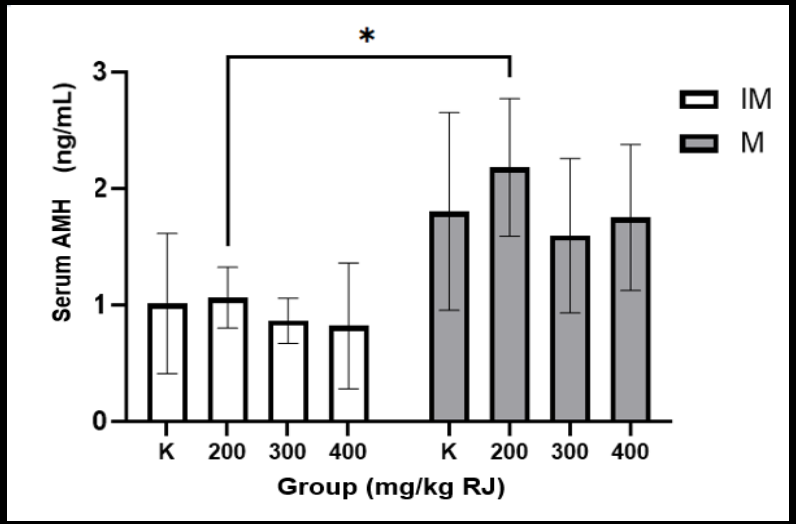
- primordial follicles (PF I),
- primary follicles (PF II),
- secondary follicles (SF),
- antral follicles (AF).

RESULT & DISCUSSION

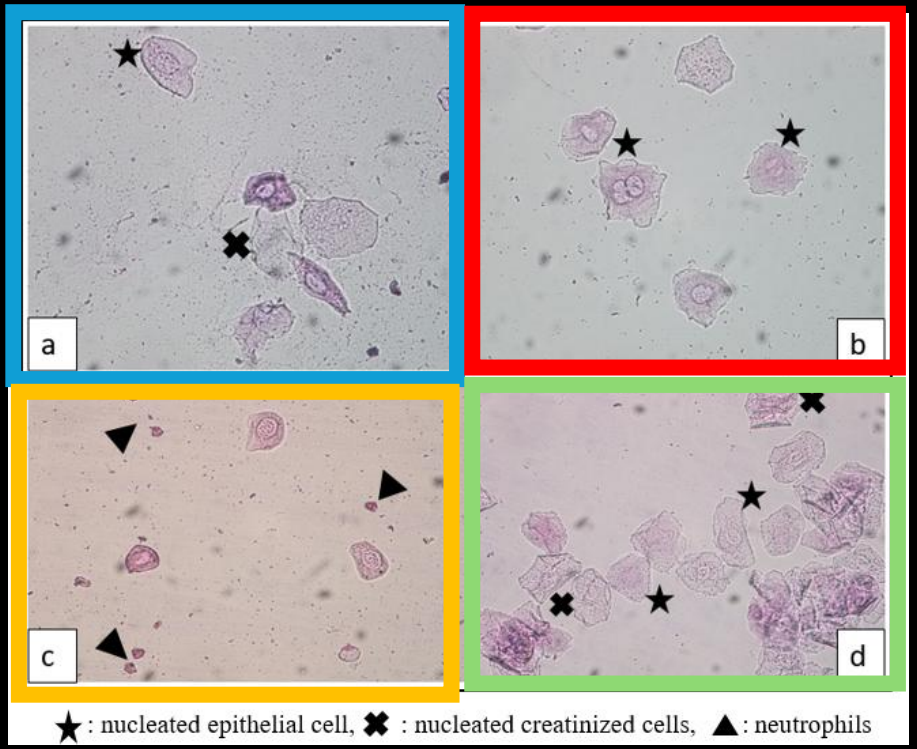

Serum Estradiol (pg/mL)
100
80
60
40
20
0
**
IM
M
K
200
300
400
K
200
300
400
Group (mg/kg RJ)


Serum Progesteron (pg/mL)
25
20
15
10
5
0
IM
M
K
200
300
400
K
200
300
400
Group (mg/kg RJ)


Serum FSH (ng/mL)
400
300
200
100
0
IM
M
K
200
300
400
K
200
300
400
Group (mg/kg RJ)

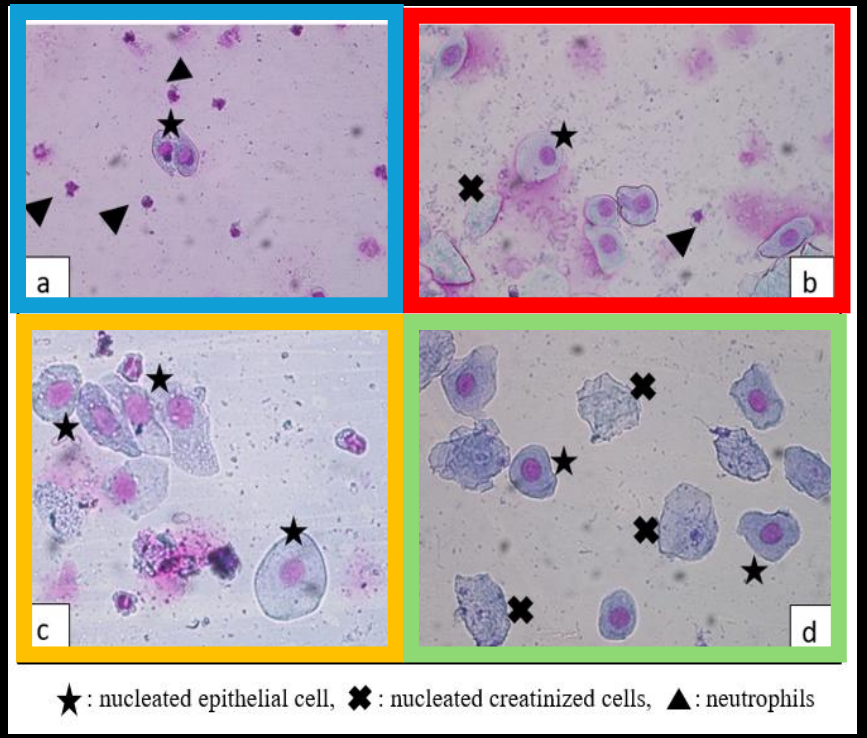

Serum AMH (ng/mL)
3
2
1
0
*
IM
M
K
200
300
400
K
200
300
400
Group (mg/kg RJ)

Immature Rats' Smear



estrus phase – nucleated cells and creatinized cells characterized in this phase

Mature Rats' Smear



metestrus phase - neutrophils with less nucleated cells characterized in this phase

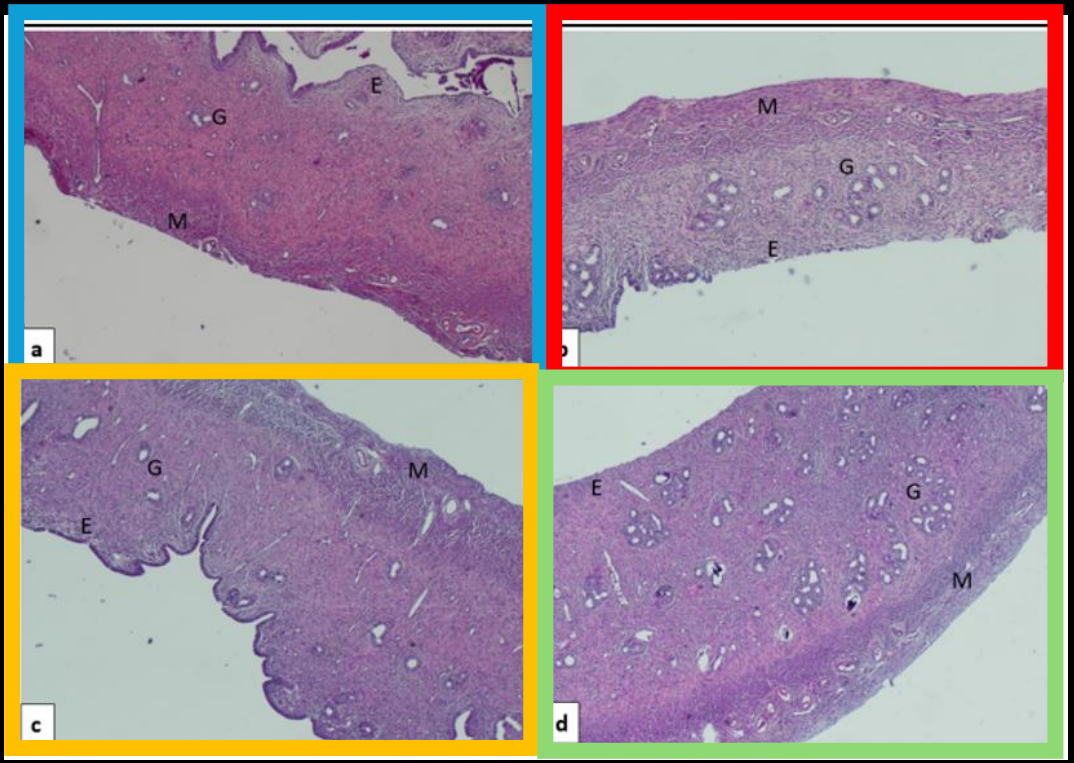
OI and UI

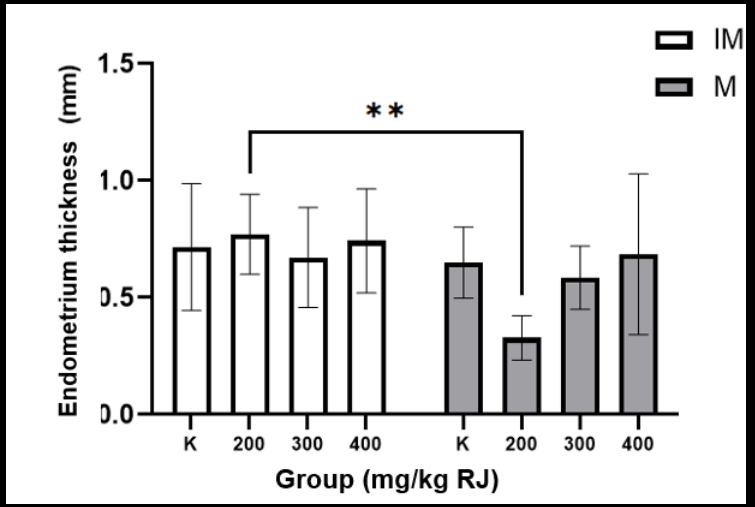
- OI; IM300-IM400 p=0.031
- UI; no statistical difference was recorded between the groups (p>0.05)
- As the royal jelly dose increased in mature rats, the uterine index decreased numerically.

Group	OI (%mg/g)	UI (%mg/g)	Group	OI (%mg/g)	UI (%mg/g)
M	0,067±0,008	0,357±0,227	IM	0,064±0,018	0,190±0,068
M200	0,058±0,006	0,201±0,068	IM200	0,070±0,036	0,070±0,079
M300	0,063±0,008	0,251±0,103	IM300	0,044±0,012	0,044±0,096
M400	0,058±0,005	0,188±0,050	IM400	0,074±0,016	0,074±0,059

Endometrium and myometrium thicknesses

IM

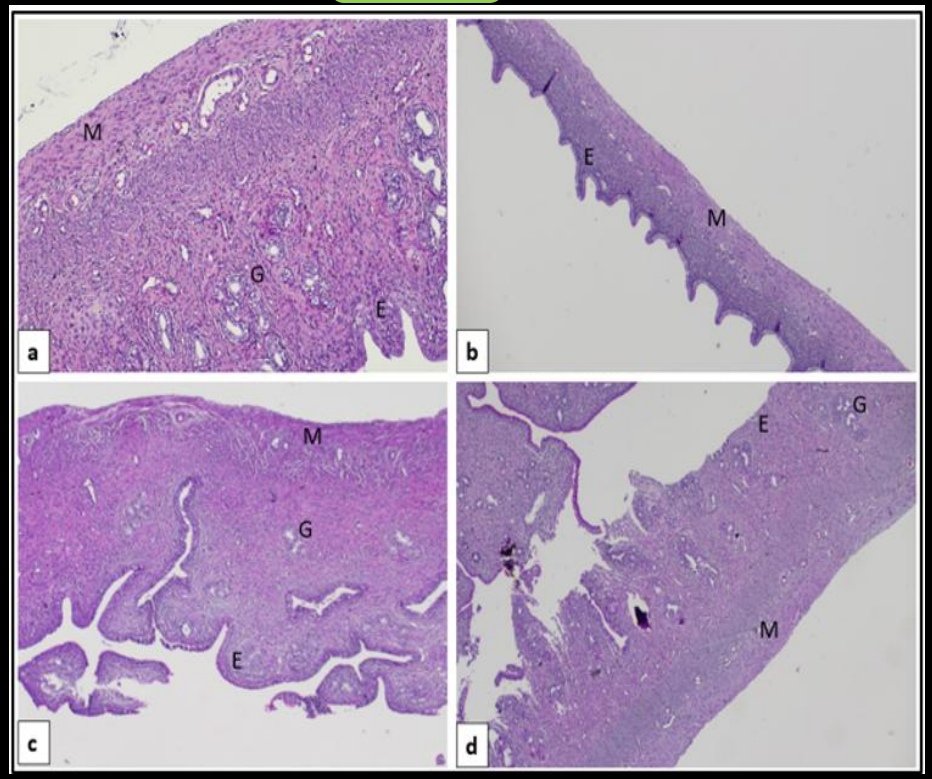


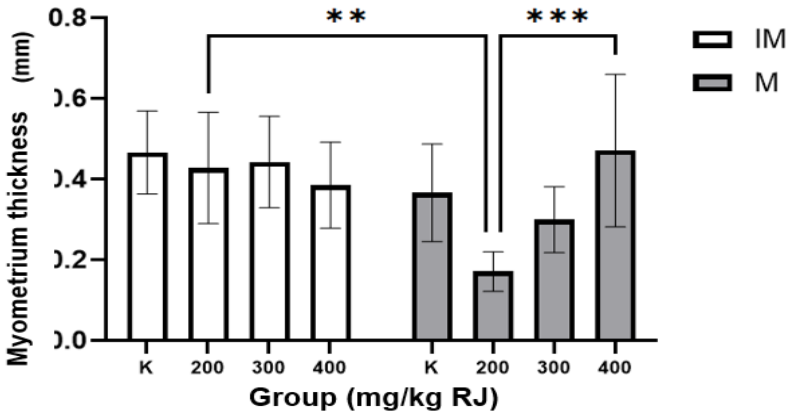


	Endometrium Kalınlığı (µm)	Myometrium Kalınlığı (µm)	Gland Yoğunluğu
IM	716.7±271.4	466.7±103.3	38.17±21.67
IM200	771.4±170.4	428.6±138.0	43.71±21.65
IM300	671.4±213.8	442.9±113.4	30.29±11.88
IM400	742.9±222.5	385.7±106.9	34.43±7.09
M	650.0±151.7	366.7±121.1	26.83±17.31
M200	328.6±95.1	171.4±48.8	26.29±9.96
M300	585.7±134.5	300.0±81.7	24.00±15.02
M400	685.7±343.7	471.4±189.0	37.00±34.97

Endometrium and myometrium thicknesses

M





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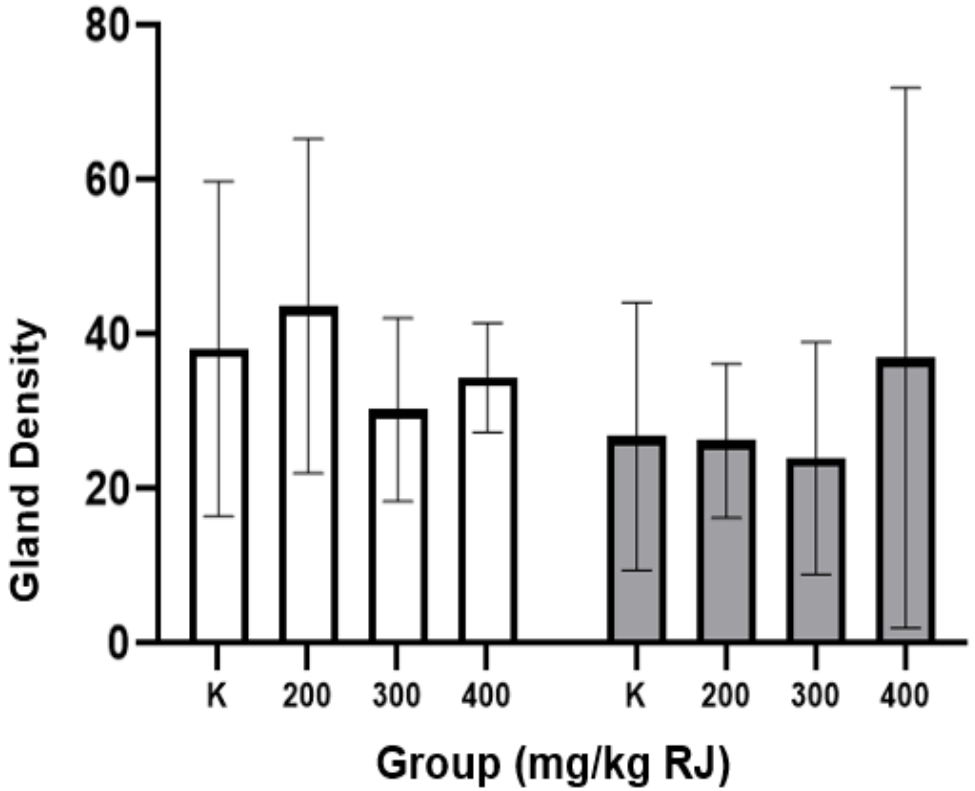
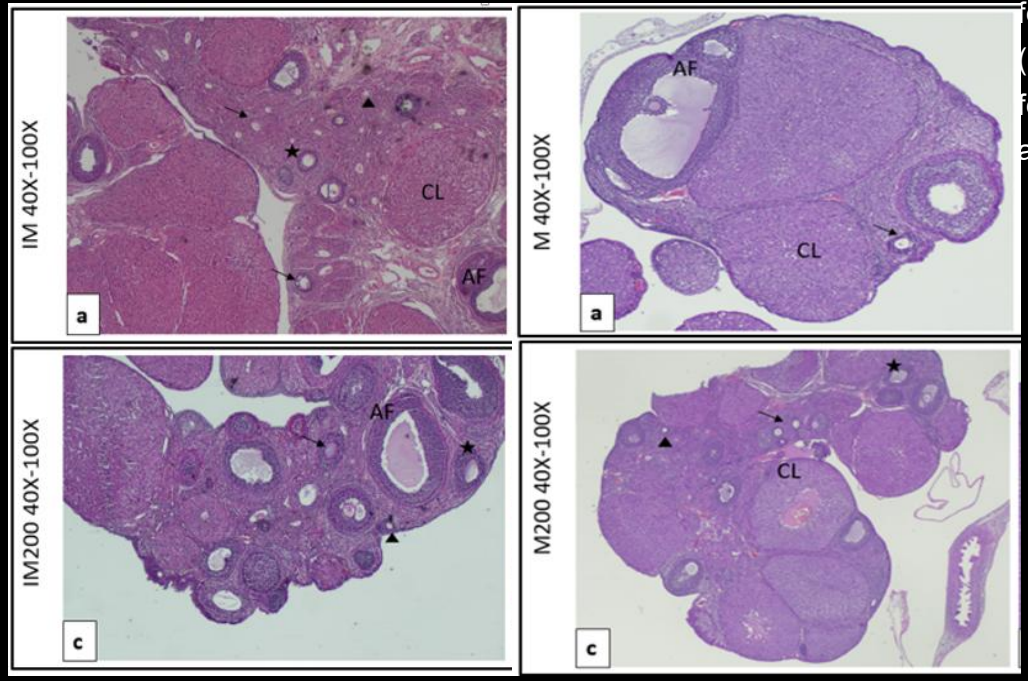
Gland Density



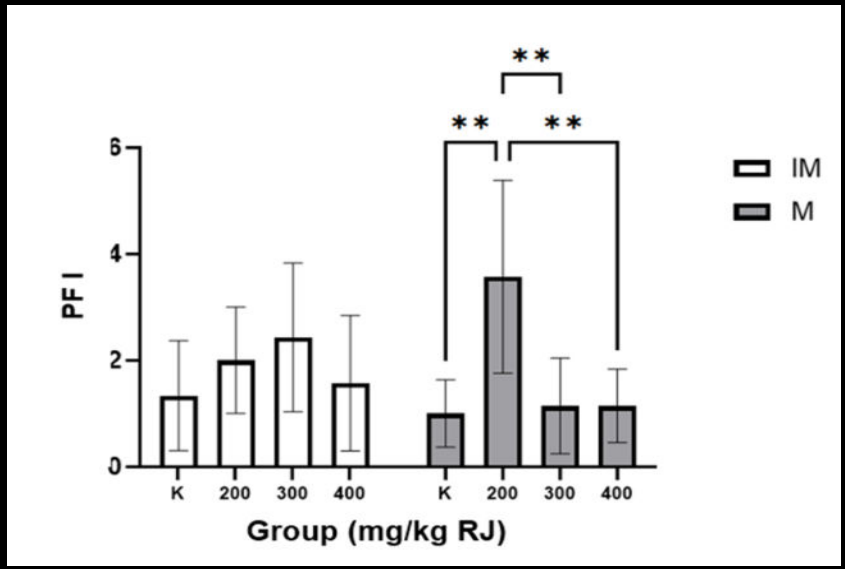
Gland Yoğunluğu
38.17±21.67
43.71±21.65
30.29±11.88
34.43±7.09
26.83±17.31
26.29±9.96
24.00±15.02
37.00±34.97

Ovarian tissue examination

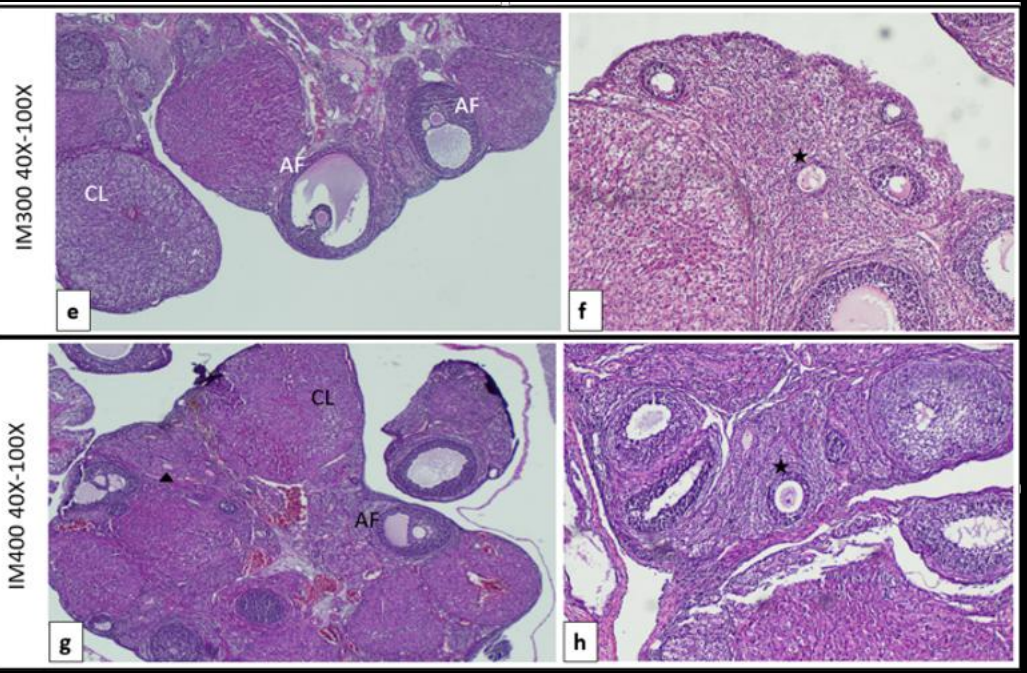
Histopathological examination of immature rat ovarian tissues revealed a limited number of primary, secondary, and antral follicles, a small number of corpus luteum, in the control group (a-b). At the 200 mg/kg dose, an increase in the number of follicles at all follicle stages and a significant proliferation of antral follicles were observed (c-d).



▲: Primordial follicle (PF I), ➘: Primer follicle (PF II), ★: Seconder follicle, AF: Antral follicle, CL: Corpus luteum

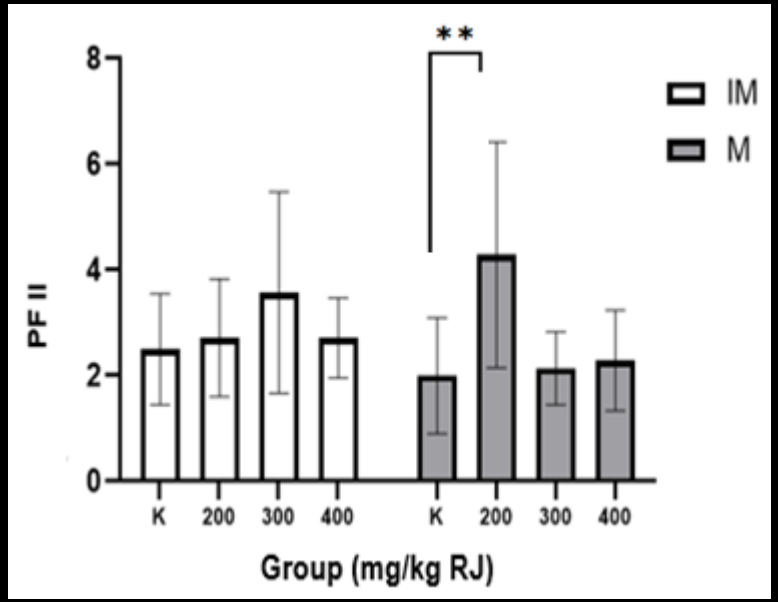


Ovarian tissue examination

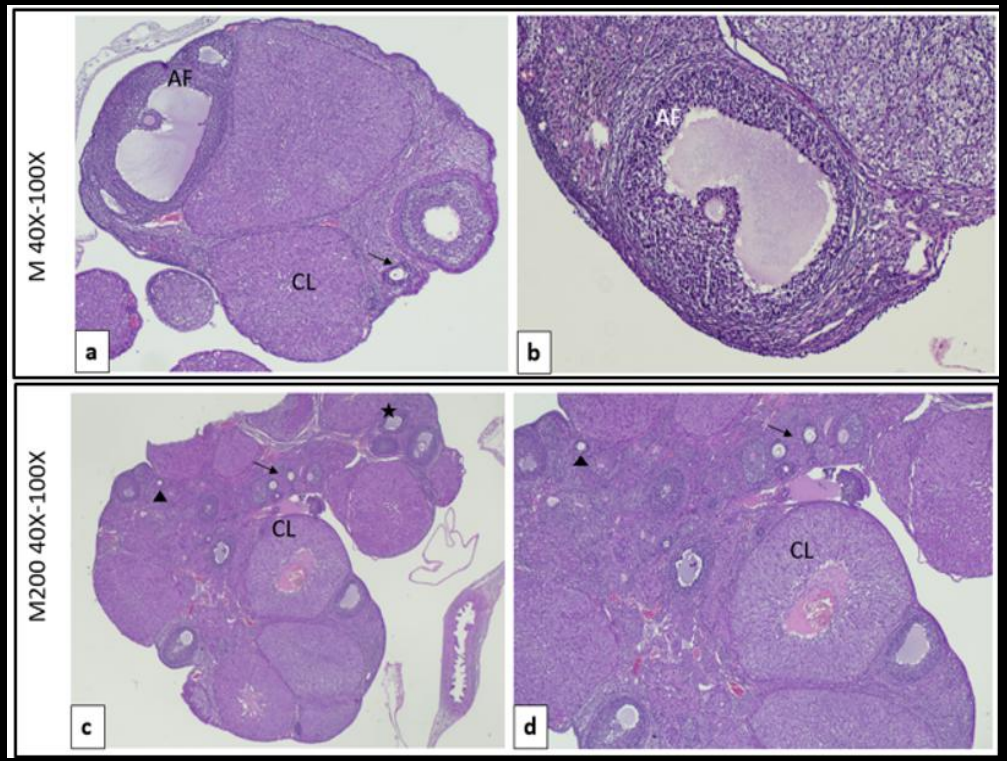


▲: Primordial follicle (PF I), ➘: Primer follicle (PF II), ★: Seconder follicle, AF: Antral follicle, CL: Corpus luteum

Advanced follicular maturation, a significant increase in the number of antral follicles, increased concentration of secondary follicles (g-h).
These findings demonstrate that royal jelly administration has a dose-dependent follicle development-supporting and ovarian activity-enhancing effect on immature ovarian tissue.

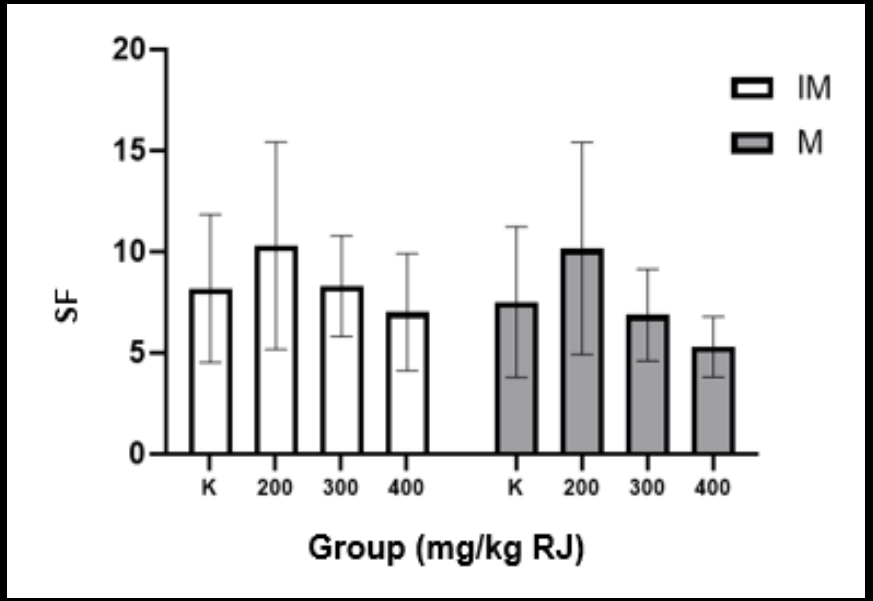


Ovarian tissue examination

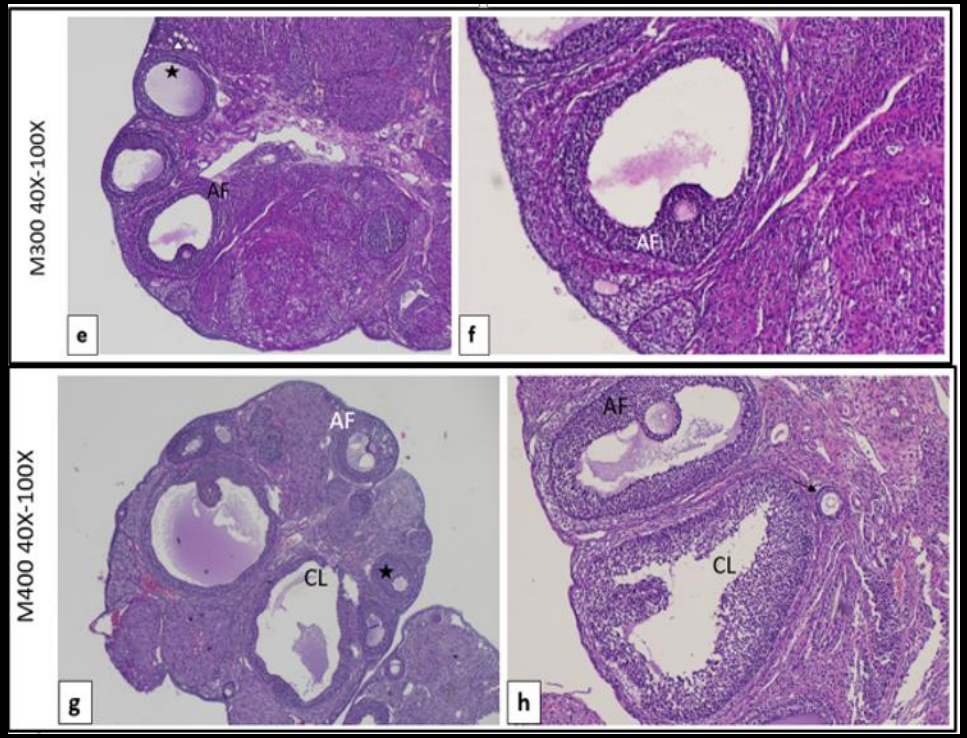


▲: Primordial follicle (PF I), ➘: Primer follicle (PF II), ★: Seconder follicle, AF: Antral follicle, CL: Corpus luteum

Histological examination of ovarian tissues from mature rats revealed the presence of mature antral follicles and a corpus luteum in the control group (a–b), with a balanced representation of developmental stages. In the M200 group (c–d), an increase in the number of primary and secondary follicles was observed, while a slight decline in antral follicle formation and general folliculogenesis was observed.

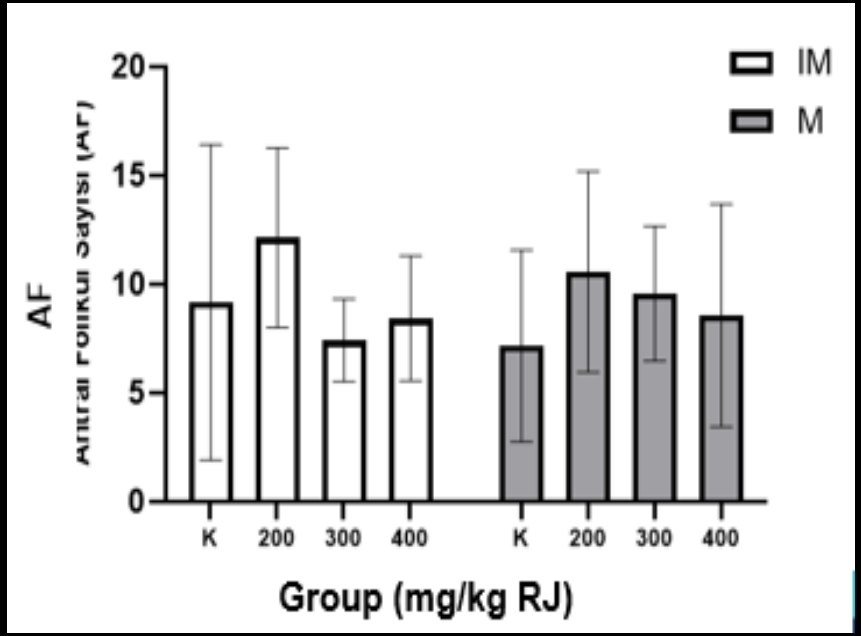


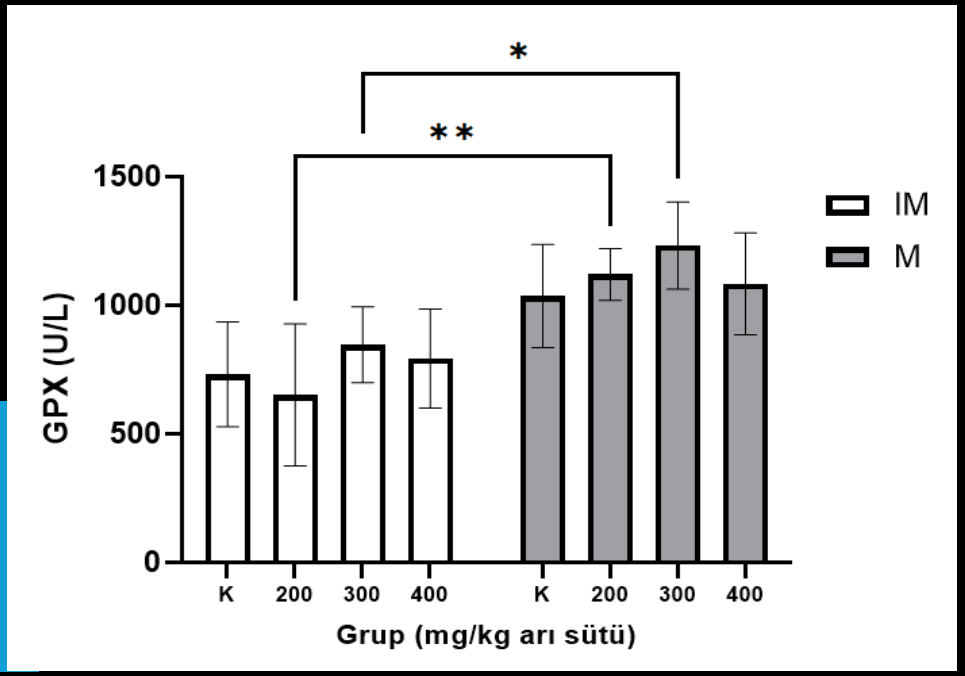
Ovarian tissue examination

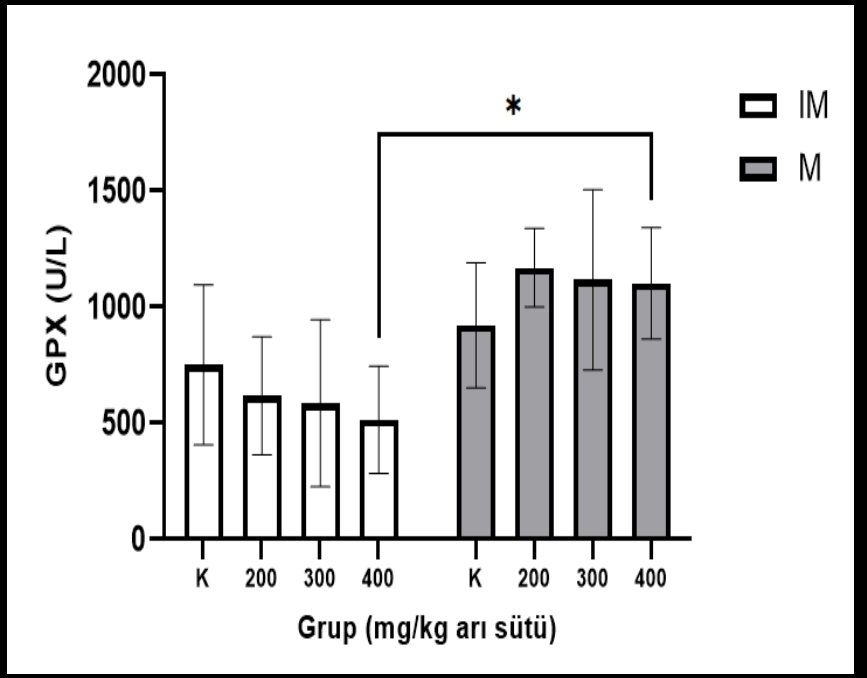


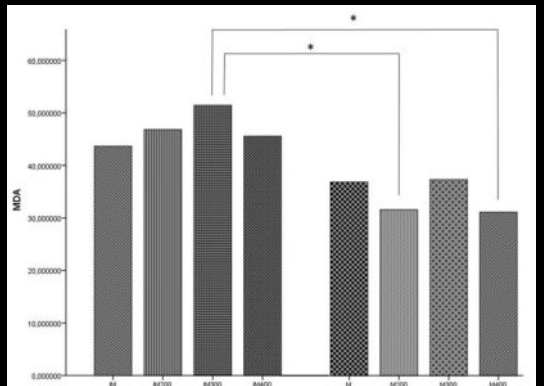
▲: Primordial follicle (PF I), ➘: Primer follicle (PF II), ★: Seconder follicle,
AF: Antral follicle, CL: Corpus luteum

In the M300 group (e–f), e mature structures were observed qnd early-stage follicles. In the M400 group (g–h), antral follicles, primary follicles, and CL formations were widely observed. These findings suggest that royal jelly has dose-dependent folliculogenesis-regulating effects in mature ovarian tissue.









Antioxidant tests

GSH-Px results pf ovarian tissues

RESULTS AND DISCUSSION

Conclution

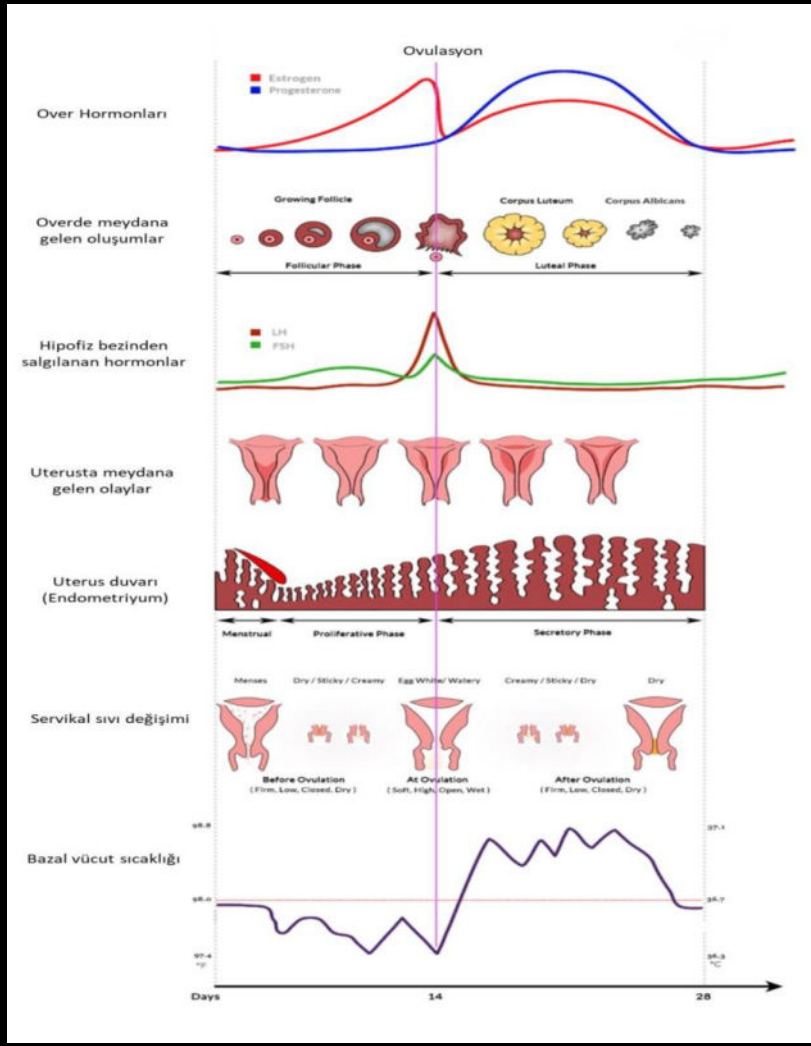
1. The results suggests that **lower of royal jelly have a more potent estrogenic effect** in **mature** groups.

2. The lack of any statistical difference in E2 levels between **immature** dose groups suggests that royal jelly does not have an estrogenic-like effect.

3. The highest AMH levels were found in mature groups fed 200 mg/kg of royal jelly. Short-term use of lower doses of royal jelly was more effective on AMH levels. (İt is maybe due to increasin GPX and decreasing MDA against to oxidative stress, apoptosis, necros)

4. FSH levels were found higher in M300 mg/kg group than M200 mg/kg group. FSH levels are naturally expected to be high during ovulation.

5. Increased endometrial thicknesses (0.33-0.69 mm) is an important factor in embryo implantation and pregnancy.

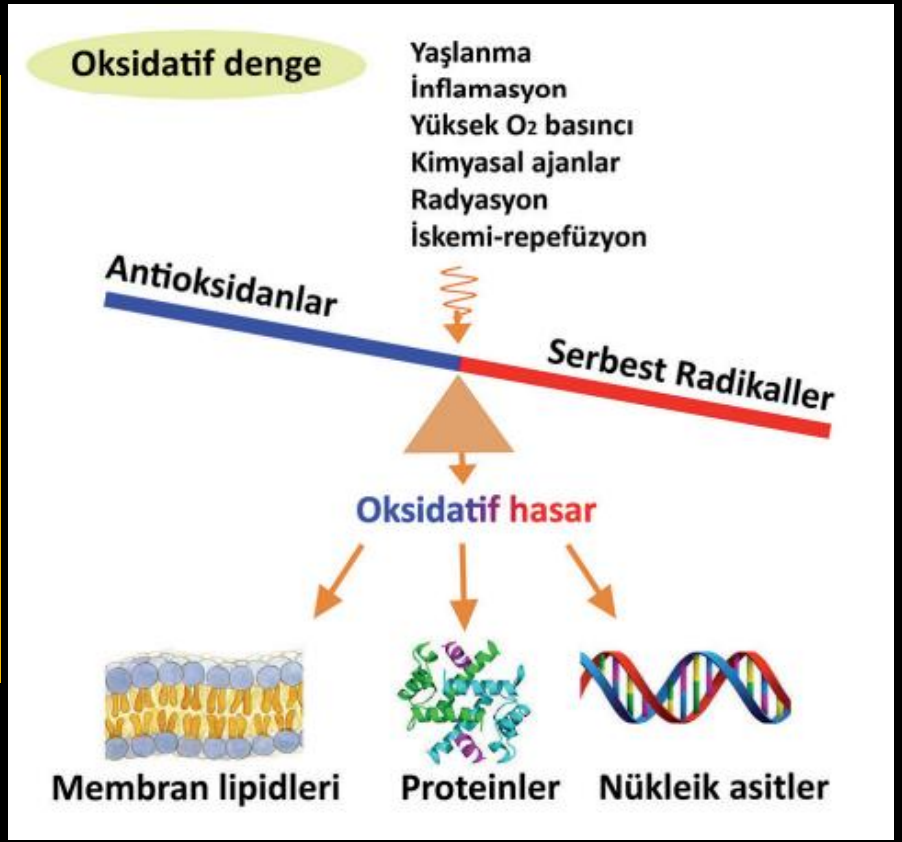


Conclution

6. According to our study, feeding 200 mg/kg of royal jelly has a positive effect on the number of follicles. In our study, GSH-Px parameter is demonstrated a strong antioxidant effect

7. The statistically significant effect of royal jelly on endometrial thickness suggests that royal jelly has a positive effect on the physical environment of the uterus.

8. The royal jelly is a powerful antioxidant with a rich nutritional content, high free radical scavenging activity, and high phenolic and flavonoid content.



Royal jelly should be used as a food supplements.

It should be used for the Complemantry medicine with some hormone drugs used for the aim of in vitro fertilization, treatment.

DAGEM
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meralkekecoglu@gmail.com

THANK
YOU