

SUMMARY OF PRODUCT CHARACTERISTICS

▼ This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions. See section 4.8 for how to report adverse reactions.

1. NAME OF THE MEDICINAL PRODUCT

REKOVELLE 12 micrograms/0.36 mL solution for injection in a pre-filled pen
REKOVELLE 36 micrograms/1.08 mL solution for injection in a pre-filled pen
REKOVELLE 72 micrograms/2.16 mL solution for injection in a pre-filled pen

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

REKOVELLE 12 micrograms/0.36 mL solution for injection

One pre-filled multidose pen delivers 12 micrograms follitropin delta* in 0.36 mL solution.

REKOVELLE 36 micrograms/1.08 mL solution for injection

One pre-filled multidose pen delivers 36 micrograms follitropin delta* in 1.08 mL solution.

REKOVELLE 72 micrograms/2.16 mL solution for injection

One pre-filled multidose pen delivers 72 micrograms follitropin delta* in 2.16 mL solution.

One mL of solution contains 33.3 micrograms of follitropin delta*

*recombinant human follicle-stimulating hormone (FSH) produced in a human cell line (PER.C6) by recombinant DNA technology.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for injection in a pre-filled pen (injection).

Clear and colourless solution with a pH of 6.0-7.0.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Controlled ovarian stimulation for the development of multiple follicles in women undergoing assisted reproductive technologies (ART) such as an *in vitro* fertilisation (IVF) or intracytoplasmic sperm injection (ICSI) cycle.

There is no clinical trial experience with REKOVELLE in the long GnRH agonist protocol (see section 5.1).

4.2 Posology and method of administration

Treatment should be initiated under the supervision of a physician experienced in the treatment of fertility problems.

Posology

The posology of REKOVELLE is individualised for each patient and aims to obtain an ovarian response which is associated with a favourable safety/efficacy profile, i.e. aims to achieve an adequate number of oocytes retrieved and reduce the interventions to prevent ovarian hyperstimulation syndrome (OHSS). REKOVELLE is dosed in micrograms (see section 5.1). The dosing regimen is specific for REKOVELLE and the microgram dose cannot be applied to other gonadotropins.

For the first treatment cycle, the individual daily dose will be determined on the basis of the woman's serum anti-Müllerian hormone (AMH) concentration and her body weight. The dose should be based on a recent determination of AMH (i.e. within the last 12 months) measured by the following diagnostic test from Roche: ELECSYS AMH Plus immunoassay (see section 4.4). The individual daily dose is to be maintained throughout the stimulation period. For women with AMH <15 pmol/L the daily dose is 12 micrograms, irrespective of body weight. For women with AMH ≥15 pmol/L the daily dose decreases from 0.19 to 0.10 micrograms/kg by increasing AMH concentration (Table 1). The dose is to be rounded off to the nearest 0.33 micrograms to match the dosing scale on the injection pen. The maximum daily dose for the first treatment cycle is 12 micrograms. For calculation of the REKOVELLE dose, the body weight is to be measured without shoes and overcoat just prior to start of stimulation.

Table 1 Dosing regimen

AMH (pmol/L)	<15	15-16	17	18	19-20	21-22	23-24	25-27	28-32	33-39	≥40
Fixed daily dose of REKOVELLE	12	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10
	mcg	mcg/kg									

The AMH concentration is to be expressed in pmol/L and is to be rounded off to the nearest integer. If the AMH concentration is in ng/mL, the concentration should be converted to pmol/L by multiplying with 7.14 (ng/mL x 7.14 = pmol/L) before use.
mcg: micrograms

Treatment with REKOVELLE should be initiated day 2 or 3 after start of menstrual bleeding, and continue until adequate follicular development (≥3 follicles ≥17 mm) has been achieved, which on average is by the ninth day of treatment (range 5 to 20 days). A single injection of 250 micrograms recombinant human chorionic gonadotropin (hCG) or 5,000 IU hCG is administered to induce final follicular maturation. In patients with excessive follicular development (of ≥25 follicles ≥12 mm), treatment with REKOVELLE should be stopped and triggering of final follicular maturation with hCG should not be performed.

For subsequent treatment cycles, the daily dose of REKOVELLE should be maintained or modified according to the patient's ovarian response in the previous cycle. If the patient had adequate ovarian response in the previous cycle without developing OHSS, the same daily dose should be used. In case of ovarian hypo-response in the previous cycle, the daily dose in the subsequent cycle should be increased by 25% or 50%, according to the extent of response observed. In case of ovarian hyper-response in the previous cycle, the daily dose in the subsequent cycle should be decreased by 20% or 33%, according to the extent of response observed. In patients who developed OHSS or were at risk of OHSS in a previous cycle, the daily dose for the subsequent cycle is 33% lower than the dose used in the cycle where OHSS or risk of OHSS occurred. The maximum daily dose is 24 micrograms.

Patients with renal and hepatic impairment

Safety, efficacy and pharmacokinetics of REKOVELLE in patients with renal or hepatic impairment have not been specifically studied in clinical trials. Although limited, data did not indicate a need for a different dosing regimen of REKOVELLE in this patient population (see section 4.4).

Polycystic ovarian syndrome patients with anovulatory disorders

Anovulatory patients with polycystic ovarian syndrome have not been studied. Ovulatory patients with polycystic ovaries have been included in clinical trials (see section 5.1).

Elderly

There is no relevant use of REKOVELLE in the elderly population.

Paediatric population

There is no relevant use of REKOVELLE in the paediatric population.

Method of administration

REKOVELLE is intended for subcutaneous use, preferably in the abdominal wall. The first injection should be performed under direct medical supervision. Patients must be educated on how to use the REKOVELLE injection pen and to perform injections. Self-administration should only be performed by patients who are well motivated, adequately trained and have access to expert advice.

For instructions on the administration with the pre-filled pen, see the "Instructions for Use".

4.3 Contraindications

- Hypersensitivity to the active substance or to any of the excipients listed in section 6.1
- tumours of the hypothalamus or pituitary gland
- ovarian enlargement or ovarian cyst not due to polycystic ovarian syndrome
- gynaecological haemorrhages of unknown aetiology (see section 4.4)
- ovarian, uterine or mammary carcinoma (see section 4.4)

In the following situations, treatment outcome is unlikely to be favourable, and therefore REKOVELLE should not be administered:

- primary ovarian failure
- malformations of sexual organs incompatible with pregnancy
- fibroid tumours of the uterus incompatible with pregnancy

4.4 Special warnings and precautions for use

REKOVELLE contains a potent gonadotropic substance capable of causing mild to severe adverse reactions, and should only be used by physicians who are thoroughly familiar with infertility problems and their management.

Gonadotropin therapy requires time commitment by physicians and supportive healthcare professionals, as well as the availability of appropriate monitoring facilities. Safe and effective use of REKOVELLE calls for monitoring of ovarian response with ultrasound alone, or in combination with measurement of serum estradiol levels, on a regular basis. The dose of REKOVELLE is individualised for each patient to obtain an ovarian response with favourable safety/efficacy profile. There may be a degree of interpatient variability in response to FSH administration, with poor response to FSH in some patients and exaggerated response in others.

Before starting treatment, the couple's infertility should be assessed as appropriate and putative contraindications for pregnancy evaluated. In particular, patients should be evaluated for hypothyroidism and hyperprolactinemia, and the appropriate specific treatment should be given.

Use of results obtained with other assays than the ELECSYS AMH Plus immunoassay from Roche for REKOVELLE dose determination is not recommended, as there currently is no standardisation of available AMH assays.

Patients undergoing stimulation of follicular growth may experience ovarian enlargement and may be at risk of developing OHSS. Adherence to the REKOVELLE dose and regimen of administration and careful monitoring of therapy will minimise the incidence of such events.

Ovarian Hyperstimulation Syndrome (OHSS)

A certain degree of ovarian enlargement is an expected effect of controlled ovarian stimulation. It is more commonly seen in patients with polycystic ovarian syndrome and usually regresses without treatment. In distinction to uncomplicated ovarian enlargement, OHSS is a condition that can manifest itself with increasing degrees of severity. It comprises marked ovarian enlargement, high serum sex steroids, and an increase in vascular permeability which can result in an accumulation of fluid in the peritoneal, pleural and, rarely, in the pericardial cavities.

It is important to stress the value of careful and frequent monitoring of follicular development in order to reduce the risk of OHSS. The following symptoms may be observed in severe cases of OHSS: abdominal pain, discomfort and distension, severe ovarian enlargement, weight gain, dyspnoea, oliguria and gastrointestinal symptoms including nausea, vomiting and diarrhoea. Clinical evaluation may reveal hypovolaemia, haemoconcentration, electrolyte imbalances, ascites, haemoperitoneum, pleural effusions, hydrothorax, or acute pulmonary distress. Very rarely, severe OHSS may be complicated by ovarian torsion or thromboembolic events such as pulmonary embolism, ischaemic stroke or myocardial infarction.

Excessive ovarian response to gonadotropin treatment seldom gives rise to OHSS unless hCG is administered to trigger final follicular maturation. Furthermore, the syndrome may be more severe and more protracted if pregnancy occurs. Therefore, in cases of ovarian hyperstimulation it is prudent to withhold hCG and advise the patient to refrain from coitus or to use barrier contraceptive methods for at least 4 days. OHSS may progress rapidly (within 24 hours to several days) to become a serious medical event. It most often occurs after hormonal treatment has been discontinued. Also, as a consequence of the hormonal changes during pregnancy, late development of OHSS can occur. Because of the risk of developing OHSS patients should be followed for at least two weeks after triggering of final follicular maturation.

Thromboembolic events

Women with recent or ongoing thromboembolic disease or women with generally recognised risk factors for thromboembolic events, such as personal or family history, severe obesity (body mass index $>30 \text{ kg/m}^2$) or thrombophilia may have an increased risk of venous or arterial thromboembolic events, during or following treatment with gonadotropins. Treatment with gonadotropins may further increase the risk for aggravation or occurrence of such events. In these women, the benefits of gonadotropin administration need to be weighed against the risks. It should be noted however that pregnancy itself as well as OHSS also carry an increased risk of thromboembolic events.

Ovarian torsion

Occurrence of ovarian torsion has been reported for ART cycles. It may be associated with other risk factors such as OHSS, pregnancy, previous abdominal surgery, past history of ovarian torsion, previous or current ovarian cyst and polycystic ovaries. Damage to the ovary due to reduced blood supply can be limited by early diagnosis and immediate detorsion.

Multiple pregnancy

Multiple pregnancy carries an increased risk of adverse maternal and perinatal outcomes. In patients undergoing ART procedures the risk of multiple pregnancy is related mainly to the number of embryos replaced, their quality and the patient age, although twin pregnancy can in rare occasions develop from single embryo transfers. The patients should be advised of the potential risk of multiple births before starting treatment.

Pregnancy loss

The incidence of pregnancy loss by miscarriage or abortion is higher in patients undergoing controlled ovarian stimulation for ART than following natural conception.

Ectopic pregnancy

Women with a history of tubal disease are at risk of ectopic pregnancy, whether the pregnancy is obtained by spontaneous conception or with fertility treatments. The prevalence of ectopic pregnancy after ART has been reported to be higher than in the general population.

Reproductive system neoplasms

There have been reports of ovarian and other reproductive system neoplasms, both benign and malignant, in women who have undergone multiple treatment regimens for infertility treatment. It is not established whether or not treatment with gonadotropins increases the risk of these tumours in infertile women.

Congenital malformation

The prevalence of congenital malformations after ART may be slightly higher than after spontaneous conceptions. This is thought to be due to differences in parental characteristics (e.g. maternal age, sperm characteristics) and multiple pregnancy.

Other medical conditions

Medical conditions that contraindicate pregnancy should also be evaluated before starting treatment with REKOVELLE.

Renal and hepatic impairment

REKOVELLE has not been studied in patients with moderate/severe renal or hepatic impairment.

Sodium content

REKOVELLE contains less than 1 mmol sodium (23 mg) per dose, i.e. essentially “sodium-free”.

4.5 Interaction with other medicinal products and other forms of interaction

No interaction studies have been performed with REKOVELLE. Clinically significant interactions with other medicinal products have neither been reported during REKOVELLE therapy, nor are expected.

4.6 Fertility, pregnancy and lactation

Pregnancy

REKOVELLE is not indicated during pregnancy. No teratogenic risk has been reported, following controlled ovarian stimulation, in clinical use with gonadotropins. There are no data from the inadvertent exposure to REKOVELLE in pregnant women. Studies in animals have shown reproductive toxicity with REKOVELLE doses above the recommended maximal dose in humans (section 5.3).

Breast-feeding

REKOVELLE is not indicated during breastfeeding.

Fertility

REKOVELLE is indicated for use in infertility (see section 4.1).

4.7 Effects on ability to drive and use machines

REKOVELLE has no or negligible influence on the ability to drive and use machines.

4.8 Undesirable effects

Summary of safety profile

The most frequently reported adverse reactions during treatment with REKOVELLE are headache, pelvic discomfort, OHSS, pelvic pain, nausea, adnexa uteri pain and fatigue. The frequency of these adverse reactions might decrease with repeated treatment cycles, as this has been observed in clinical trials.

Tabulated list of adverse reactions

The table below (Table 2) displays the adverse reactions in patients treated with REKOVELLE in the pivotal clinical trials according to MedDRA system organ class and frequency as follows: common ($\geq 1/100$ to $< 1/10$) and uncommon ($\geq 1/1,000$ to $< 1/100$). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

Table 2 Adverse reactions in pivotal clinical trials

System Organ Class	Common (≥1/100 to <1/10)	Uncommon (≥1/1,000 to <1/100)
Psychiatric disorders		Mood swings
Nervous system disorders	Headache	Somnolence Dizziness
Gastrointestinal disorders	Nausea	Diarrhoea Vomiting Constipation Abdominal discomfort
Reproductive system and breast disorders	OHSS Pelvic pain Adnexa uteri pain Pelvic discomfort	Vaginal haemorrhage Breast pain Breast tenderness
General disorders and administration site conditions	Fatigue	

Description of selected adverse reactions

OHSS is an intrinsic risk of the ovarian stimulation. Known gastrointestinal symptoms associated with OHSS include abdominal pain, discomfort, and distension, nausea, vomiting and diarrhoea. Ovarian torsion and thromboembolic events are known to be rare complications of ovarian stimulation treatment (see section 4.4).

Immunogenicity in terms of development of anti-FSH antibodies is a potential risk of gonadotropin therapy (see section 5.1).

Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via **the national reporting system listed in Appendix V**.

4.9 Overdose

The effect of an overdose is unknown, nevertheless, there is a risk that OHSS may occur (see section 4.4).

5. PHARMACOLOGICAL PROPERTIES**5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Sex hormones and modulators of the genital systems, gonadotropins, ATC code: G03GA10

Mechanism of action

The most important effect resulting from parenteral administration of FSH is the development of multiple mature follicles.

Follitropin delta is a recombinant human FSH. The amino acid sequences of the two FSH subunits in follitropin delta are identical to the endogenous human FSH sequences. Because follitropin delta is produced in the human cell line PER.C6, the glycosylation profile is different from follitropin alfa and follitropin beta.

Pharmacodynamic effects

Following daily administration of equal IU doses of REKOVELLE and follitropin alfa as determined in the rat *in vivo* bioassay (Steelman-Pohley assay), higher ovarian response (i.e. estradiol, inhibin B and follicular volume) was observed in patients after administration of REKOVELLE compared to follitropin alfa. As the rat bioassay might not fully reflect the potency of the FSH in REKOVELLE in humans, REKOVELLE is dosed in micrograms and not in IU.

The number of oocytes retrieved increases with the dose of REKOVELLE and serum AMH concentration. Conversely, increasing body weight leads to a decrease in the number of oocytes retrieved (only clinically relevant for REKOVELLE doses below 12 micrograms). The resulting REKOVELLE dosing regimen is in section 4.2.

Clinical efficacy and safety

The ESTHER-1 trial was a randomised, assessor-blinded, controlled trial in 1,326 IVF/ICSI patients. The trial compared the individualised dosing regimen of REKOVELLE where the daily dose is established for each patient and fixed throughout stimulation with no adjustments (see section 4.2) to follitropin alfa filled-by-mass at a starting dose of 11 micrograms (150 IU) for the first five days followed by dose adjustments from day 6 of stimulation based on follicular development in a GnRH antagonist protocol. The patients were up to 40 years of age and had regular menstrual cycles presumed to be ovulatory. Single blastocyst transfer on day 5 was compulsory with the exception of patients 38-40 years in whom double blastocyst transfer was performed if no good-quality blastocysts were available. The two co-primary endpoints were ongoing pregnancy rate and ongoing implantation rate in the fresh cycle, defined as at least one intrauterine viable fetus 10-11 weeks after transfer and number of intrauterine viable fetuses 10-11 weeks after transfer divided by number of blastocysts transferred, respectively.

The trial demonstrated that REKOVELLE was at least as effective as follitropin alfa in terms of ongoing pregnancy rate and ongoing implantation rate, as shown in Table 3.

Table 3 Ongoing pregnancy rate and ongoing implantation rate in ESTHER-1 trial

	REKOVELLE in an individualised dosing regimen (N=665)	Follitropin alfa (N=661)	Difference [95% CI]
Ongoing pregnancy rate	30.7%	31.6%	-0.9% [-5.9%; 4.1%]
Ongoing implantation rate	35.2%	35.8%	-0.6% [-6.1%; 4.8%]

Population: all randomised and exposed

The impact of the AMH-based dosing regimen of REKOVELLE was also assessed in secondary endpoints, such as ovarian response and OHSS risk management.

In the overall trial population, the mean number of oocytes retrieved was 10.0 ± 5.6 with REKOVELLE (N=636) in the individualised dosing regimen and 10.4 ± 6.5 with follitropin alfa (N=643) at a starting dose of 150 IU followed by dose adjustments.

Among patients with AMH ≥ 15 pmol/L, the ovarian response with REKOVELLE (N=355) and follitropin alfa (N=353), respectively, was as follows: mean number of oocytes retrieved 11.6 ± 5.9 and 13.3 ± 6.9 , and proportion of patients with ≥ 20 oocytes 10.1% (36/355) and 15.6% (55/353).

In ovulatory patients with polycystic ovaries, the incidence of early moderate/severe OHSS and/or preventive interventions for early OHSS was 7.7% with REKOVELLE and 26.7% with follitropin alfa.

Safety – immunogenicity

Anti-FSH antibodies were measured pre-dosing and post-dosing in patients undergoing up to three repeated treatment cycles with REKOVELLE (665 patients in cycle 1 in the ESTHER-1 trial as well as 252 patients in cycle 2 and 95 patients in cycle 3 in the ESTHER-2 trial). The incidence of anti-FSH antibodies after treatment with REKOVELLE was 1.1% in cycle 1, 0.8% in cycle 2 and 1.1% in cycle 3. These rates were similar to the incidence of pre-existing anti-FSH antibodies before exposure to REKOVELLE in cycle 1 which was 1.4%, and comparable to the incidences of anti-FSH antibodies after treatment with follitropin alfa. In all patients with anti-FSH antibodies, titres were undetectable or very low and without neutralising capacity. Repeated treatment with REKOVELLE of patients with pre-existing or treatment-induced anti-FSH antibodies did not increase the antibody titre, was not associated with decreased ovarian response, and did not induce immune-related adverse events.

There is no clinical trial experience with REKOVELLE in the long GnRH agonist protocol.

5.2 Pharmacokinetic properties

The pharmacokinetic profile of follitropin delta has been investigated in healthy female subjects and in IVF/ICSI patients undergoing COS. Following repeated daily subcutaneous administrations, REKOVELLE reaches steady-state within 6 to 7 days with a threefold higher concentration compared with the concentration after the first dose. Circulating levels of follitropin delta are inversely related to the body weight, which supports individualised dosing based on body weight. Follitropin delta leads to greater exposure than follitropin alfa.

Absorption

After daily subcutaneous administration of REKOVELLE, the time to maximum serum concentration is 10 hours. The absolute bioavailability is about 64%.

Distribution

The apparent volume of distribution is about 25 L after subcutaneous administration and the volume of distribution at steady state is 9 L after intravenous administration. Within the therapeutic dose range, exposure to follitropin delta increases proportionally with the dose.

Elimination

Following subcutaneous administration, the apparent clearance of follitropin delta is 0.6 L/h and the clearance after intravenous is 0.3 L/h. The terminal elimination half-life after single subcutaneous administration is 40 hours and after multiple subcutaneous administration is 28 hours. The apparent clearance for follitropin delta is low, i.e. 0.6 L/h after multiple subcutaneous administration, leading to high exposure. Follitropin delta is expected to be eliminated similarly to other follitropins, i.e. mainly by the kidneys. The fraction of follitropin delta excreted unchanged in the urine was estimated to 9%.

5.3 Preclinical safety data

Non-clinical data reveal no special hazard for humans based on conventional studies of safety pharmacology, repeated dose toxicity and local tolerance. The overdose of follitropin delta resulted in pharmacological or exaggerated pharmacological actions. Follitropin delta had a negative effect on fertility and early embryonic development in rats when administered in doses ≥ 0.8 micrograms/kg/day which is above the recommended maximal dose in humans. The relevance of these findings for the clinical use of REKOVELLE is limited.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Phenol
Polysorbate 20
L-methionine

Sodium sulphate decahydrate
Disodium phosphate dodecahydrate
Phosphoric acid, concentrated (for pH-adjustment)
Sodium hydroxide (for pH-adjustment)
Water for injections

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

3 years.

In use: 28 days when stored at or below 25 °C.

6.4 Special precautions for storage

Store in a refrigerator (2 °C – 8 °C).

Do not freeze.

Before first use, store in the original package in order to protect from light.

REKOVELLE may be removed from the refrigerator, without being refrigerated again, and stored at or below 25 °C for up to 3 months including the period after first use. It must be discarded afterwards.

For storage conditions after first use of the medicinal product, see section 6.3.

6.5 Nature and contents of container

REKOVELLE 12 micrograms/0.36 mL solution for injection

3 mL multidose cartridge (Type I glass) with a plunger (halobutyl rubber) and a crimp cap (aluminium) with an inlay (rubber). Each cartridge contains 0.36 mL of solution.

Pack size of 1 pre-filled pen and 3 injection needles (stainless steel).

REKOVELLE 36 micrograms/1.08 mL solution for injection

3 mL multidose cartridge (Type I glass) with a plunger (halobutyl rubber) and a crimp cap (aluminium) with an inlay (rubber). Each cartridge contains 1.08 mL of solution.

Pack size of 1 pre-filled pen and 6 injection needles (stainless steel).

REKOVELLE 72 micrograms/2.16 mL solution for injection

3 mL multidose cartridge (Type I glass) with a plunger (halobutyl rubber) and a crimp cap (aluminium) with an inlay (rubber). Each cartridge contains 2.16 mL of solution.

Pack size of 1 pre-filled pen and 9 injection needles (stainless steel).

6.6 Special precautions for disposal and other handling

The solution should not be administered if it contains particles or is not clear.

The instructions for use of the pen must be followed. Discard used needles immediately after injection.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

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Kay Fiskers Plads 11
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Denmark

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/16/1150/004
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