

Talzenna[®] **(talazoparib)**

1. NAME OF THE MEDICINAL PRODUCT

Talzenna 0.25 mg hard capsules
Talzenna 1 mg hard capsules

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Talzenna 0.25 mg hard capsules

Each hard capsule contains 0.363 mg talazoparib tosylate equivalent to 0.25 mg talazoparib.

Talzenna 1 mg hard capsules

Each hard capsule contains 1.453 mg talazoparib tosylate equivalent to 1 mg talazoparib.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Hard capsule (capsule).

Talzenna 0.25 mg hard capsules

Opaque, approximately 14.30 mm x 5.32 mm hard capsule with an ivory cap (printed with “Pfizer” in black) and a white body (printed with “TLZ 0.25” in black).

Talzenna 1 mg hard capsules

Opaque, approximately 14.30 mm x 5.32 mm hard capsule with a light red cap (printed with “Pfizer” in black) and a white body (printed with “TLZ 1” in black).

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Talzenna is indicated as monotherapy for the treatment of adult patients with germline BRCA1/2-mutations, who have HER2-negative locally advanced or metastatic breast cancer. Patients should have been previously treated with an anthracycline and/or a taxane in the (neo)adjuvant, locally advanced or metastatic setting unless patients were not suitable for these treatments (see section 5.1). Patients with hormone receptor (HR)-positive breast cancer should have been treated with a prior endocrine-based therapy, or be considered unsuitable for endocrine-based therapy.

4.2 Posology and method of administration

Treatment with Talzenna should be initiated and supervised by a physician experienced in the use of anticancer medicinal products.

Patients should be selected for the treatment of breast cancer with Talzenna based on the presence of deleterious or suspected deleterious germline BRCA mutations determined by an experienced laboratory using a validated test method.

Genetic counselling for patients with BRCA mutations should be performed as applicable.

Posology

The recommended dose is 1 mg talazoparib once daily. Patients should be treated until disease progression or unacceptable toxicity occurs.

Missing dose

If the patient vomits or misses a dose, an additional dose should not be taken. The next prescribed dose should be taken at the usual time.

Dose adjustments

To manage adverse drug reactions, interruption of treatment or dose reduction based on severity and clinical presentation should be considered (Table 2). Recommended dose reductions are indicated in Table 1.

Table 1. Dose adjustments for toxicities

	Dose level
Recommended starting dose	1 mg (one 1 mg capsule) once daily
First dose reduction	0.75 mg (three 0.25 mg capsules) once daily
Second dose reduction	0.5 mg (two 0.25 mg capsules) once daily
Third dose reduction	0.25 mg (one 0.25 mg capsule) once daily

Complete blood count should be obtained prior to starting Talzenna therapy and monitored monthly and as clinically indicated (see Table 2 and section 4.4).

Table 2. Dose modification and management

	Withhold Talzenna until levels resolve to	Resume Talzenna
Haemoglobin < 8 g/dL	≥ 9 g/dL	Resume Talzenna at next lower dose
Platelet count < 50,000/μL	≥ 75,000/μL	
Neutrophil count < 1,000/μL	≥ 1,500/μL	
Non-haematologic adverse reaction Grade 3 or Grade 4	≤ Grade 1	Consider resuming Talzenna at next lower dose or discontinue

Concomitant treatment with inhibitors of P-glycoprotein (P-gp)

Strong inhibitors of P-gp may lead to increased talazoparib exposure. Concomitant use of strong P-gp inhibitors during treatment with talazoparib should be avoided. Co-administration should only be considered after careful evaluation of the potential benefits and risks. If co-administration with a strong P-gp inhibitor is unavoidable, the Talzenna dose should be reduced to 0.75 mg once daily. When the strong P-gp inhibitor is discontinued, the Talzenna dose should be increased (after 3-5 half-lives of the P-gp inhibitor) to the dose used prior to the initiation of the strong P-gp inhibitor (see section 4.5).

Special populations

Hepatic impairment

No dose adjustment is required for patients with mild hepatic impairment (total bilirubin $\leq 1 \times$ upper limit of normal [ULN] and aspartate aminotransferase (AST) $>$ ULN, or total bilirubin > 1.0 to $1.5 \times$ ULN and any AST). Talzenna has not been studied in patients with moderate (total bilirubin > 1.5 to $3.0 \times$ ULN and any AST) or severe hepatic impairment (total bilirubin $> 3.0 \times$ ULN and any AST) (see section 5.2). Talzenna may only be used in patients with moderate or severe hepatic impairment if the benefit outweighs the potential risk, and the patient should be carefully monitored for hepatic function and adverse events.

Renal impairment

No dose adjustment is required for patients with mild renal impairment ($60 \text{ mL/min} \leq$ creatinine clearance [CrCl] $< 90 \text{ mL/min}$). For patients with moderate renal impairment ($30 \text{ mL/min} \leq \text{CrCl} < 60 \text{ mL/min}$), the recommended starting dose of Talzenna is 0.75 mg once daily. Talzenna has not been studied in patients with severe renal impairment (CrCl $< 30 \text{ mL/min}$) or patients requiring haemodialysis. Talzenna is not recommended for use in patients with severe renal impairment or requiring haemodialysis (see section 5.2). Talzenna may only be used in patients with severe renal impairment if the benefit outweighs the potential risk, and the patient should be carefully monitored for renal function and adverse events (see section 5.2).

Elderly

No dose adjustment is necessary in elderly (≥ 65 years of age) patients (see section 5.2).

Paediatric population

The safety and efficacy of Talzenna in children and adolescents < 18 years of age have not been established. No data are available.

Method of administration

Talzenna is for oral use. To avoid contact with the capsule content, the capsules should be swallowed whole, and must not be opened or dissolved. They can be taken with or without food (see section 5.2).

4.3 Contraindications

Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

Breast-feeding (see section 4.6).

4.4 Special warnings and precautions for use

Myelosuppression

Myelosuppression consisting of anaemia, leucopenia/neutropenia, and/or thrombocytopenia, have been reported in patients treated with talazoparib (see section 4.8). Talazoparib should not be started until patients have recovered from haematological toxicity caused by previous therapy (\leq Grade 1).

Precautions should be taken to routinely monitor haematology parameters and signs and symptoms associated with anaemia, leucopenia/neutropenia, and/or thrombocytopenia in patients receiving talazoparib. If such events occur, dose modifications (reduction or interruption) are recommended (see section 4.2). Supportive care with or without blood and/or

platelet transfusions and/or administration of colony stimulating factors may be used as appropriate.

Myelodysplastic syndrome/Acute myeloid leukaemia

Myelodysplastic syndrome/Acute Myeloid Leukaemia (MDS/AML) have been reported in patients who received poly (adenosine diphosphate-ribose) polymerase (PARP) inhibitors, including talazoparib. Overall, MDS/AML has been reported in 2 out of 584 (0.3%) solid tumour patients treated with talazoparib in clinical studies. Potential contributing factors for the development of MDS/AML include previous platinum-containing chemotherapy, other DNA damaging agents or radiotherapy. Complete blood counts should be obtained at baseline and monitored monthly for signs of haematologic toxicity during treatment. If MDS/AML is confirmed, talazoparib should be discontinued.

Contraception in women of childbearing potential

Talazoparib was clastogenic in an *in vitro* chromosomal aberration assay in human peripheral blood lymphocytes and in an *in vivo* bone marrow micronucleus assay in rats but not mutagenic in Ames assay (see section 5.3), and may cause foetal harm when administered to a pregnant woman. Pregnant women should be advised of the potential risk to the foetus (see section 4.6). Women of childbearing potential should not become pregnant while receiving Talzenna and should not be pregnant at the beginning of treatment. A pregnancy test should be performed on all women of childbearing potential prior to treatment.

A highly effective method of contraception is required for female patients during treatment with Talzenna, and for at least 7 months after completing therapy. Since the use of hormonal contraception is not recommended in patients with breast cancer, two non-hormonal and complementary contraception methods should be used (see section 4.6).

Male patients with female partners of reproductive potential or pregnant partners should be advised to use effective contraception (even after vasectomy), during treatment with Talzenna and for at least 4 months after the final dose.

4.5 Interaction with other medicinal products and other forms of interaction

Talazoparib is a substrate for drug transporters P-gp and Breast Cancer Resistance Protein (BCRP) and it is mainly eliminated by renal clearance as unchanged compound.

Agents that may affect talazoparib plasma concentrations

P-gp inhibitors

Data from a drug-drug interaction study in patients with advanced solid tumours indicated that co-administration of multiple daily doses of a P-gp inhibitor, itraconazole 100 mg twice daily with a single 0.5 mg talazoparib dose increased talazoparib total exposure (AUC_{inf}) and peak concentration (C_{max}) by approximately 56% and 40%, respectively, relative to a single 0.5 mg talazoparib dose administered alone. Population pharmacokinetic (PK) analysis has also shown that concomitant use of strong P-gp inhibitors increased talazoparib exposure by 45%, relative to talazoparib given alone.

Concomitant use of strong P-gp inhibitors (including but not limited to amiodarone, carvedilol, clarithromycin, cobicistat, darunavir, dronedarone, erythromycin, indinavir, itraconazole, ketoconazole, lapatinib, lopinavir, propafenone, quinidine, ranolazine, ritonavir, saquinavir, telaprevir, tipranavir, and verapamil) should be avoided. If co-administration with a strong P-gp inhibitor is unavoidable, the Talzenna dose should be reduced (see section 4.2).

P-gp inducers

Data from a drug-drug interaction study in patients with advanced solid tumours indicated that co-administration of single 1 mg talazoparib dose with multiple daily doses of a P-gp inducer, rifampin 600 mg, with rifampin co-administered 30 minutes before talazoparib on the day of talazoparib dosing, increased talazoparib C_{max} by approximately 37% whereas AUC_{inf} was not affected relative to a single 1 mg talazoparib dose administered alone. This is probably the net effect of both P-gp induction and inhibition by rifampin under the tested conditions in the drug-drug interaction study. No talazoparib dose adjustments are required when co-administered with rifampin. However, the effect of other P-gp inducers on talazoparib exposure has not been studied. Other P-gp inducers (including but not limited to carbamazepine, phenytoin, and St. John's wort) may decrease talazoparib exposure.

BCRP inhibitors

The effect of BCRP inhibitors on PK of talazoparib has not been studied *in vivo*. Co-administration of talazoparib with BCRP inhibitors may increase talazoparib exposure. Concomitant use of strong BCRP inhibitors (including but not limited to curcumin and cyclosporine) should be avoided. If co-administration of strong BCRP inhibitors cannot be avoided, patient should be monitored for potential increased adverse reactions.

Effect of acid-reducing agents

Population PK analysis indicates that co-administration of acid-reducing agents including proton pump inhibitors and histamine receptor 2 antagonists (H_2RA), or other acid-reducing agents had no significant impact on the absorption of talazoparib.

Systemic hormonal contraception

Drug-drug interaction studies between talazoparib and oral contraceptives have not been conducted.

4.6 Fertility, pregnancy and lactation

Women of childbearing potential/Contraception in males and females

Women of childbearing potential should not become pregnant while receiving Talzenna and should not be pregnant at the beginning of treatment. A pregnancy test should be performed on all women of childbearing potential prior to treatment (see section 4.4).

Women of childbearing potential must use highly effective forms of contraception (see section 4.4) prior to starting treatment with talazoparib, during treatment, and for 7 months after stopping treatment with talazoparib. Since the use of hormonal contraception is not recommended in patients with breast cancer, two non-hormonal and complementary contraception methods should be used. Male patients with female partners of reproductive potential or pregnant partners should be advised to use effective contraception (even after vasectomy) during treatment with Talzenna, and for at least 4 months after the final dose (see section 4.4).

Pregnancy

There are no data from the use of Talzenna in pregnant women. Studies in animals have shown embryo-foetal toxicity (see section 5.3). Talzenna may cause foetal harm when administered to a pregnant woman. Talzenna is not recommended during pregnancy or for women of childbearing potential not using contraception (see section 4.4).

Breast-feeding

It is unknown whether talazoparib is excreted in human breast milk. A risk to breast-fed children cannot be excluded and therefore breast-feeding is not recommended during treatment with Talzenna and for at least 1 month after the final dose.

Fertility

There is no information on fertility in patients. Based on non-clinical findings in testes (partially reversible) and ovary (reversible), Talzenna may impair fertility in males of reproductive potential (see section 5.3).

4.7 Effects on ability to drive and use machines

Talzenna may have a minor influence on the ability to drive and use machines. Fatigue/asthenia or dizziness may occur following administration of talazoparib.

4.8 Undesirable effects

Summary of the safety profile

The overall safety profile of Talzenna is based on pooled data from 494 patients who received talazoparib at 1 mg daily in clinical studies for solid tumours, including 286 patients from a randomised Phase 3 study with germline BRCA-mutated (gBRCAm), HER2-negative locally advanced or metastatic breast cancer and 83 patients from a nonrandomised Phase 2 study in patients with germline BRCA-mutated locally advanced or metastatic breast cancer.

The most common ($\geq 25\%$) adverse reactions in patients receiving talazoparib in these clinical studies were fatigue (57.1%), anaemia (49.6%), nausea (44.3%), neutropenia (30.2%), thrombocytopenia (29.6%), and headache (26.5%). The most common ($\geq 10\%$) Grade ≥ 3 adverse reactions of talazoparib were anaemia (35.2%), neutropenia (17.4%), and thrombocytopenia (16.8%).

Dose modifications (dose reductions or dose interruptions) due to any adverse reaction occurred in 62.3% of patients receiving Talzenna. The most common adverse reactions leading to dose modifications were anaemia (33.0%), neutropenia (15.8%), and thrombocytopenia (13.4%).

Permanent discontinuation due to an adverse reaction occurred in 3.6% of patients receiving Talzenna. The median duration of exposure was 5.4 months (range 0.03-61.1).

Tabulated list of adverse reactions

Table 3 summarises adverse reactions based on pooled dataset listed by system organ class, and frequency category. Frequency categories are defined as: very common ($\geq 1/10$) and common ($\geq 1/100$ to $< 1/10$). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

Table 3. Adverse reactions based on pooled dataset from 5 studies (N=494)

System organ class Frequency Preferred term	All grades* n (%)	Grade 3 n (%)	Grade 4 n (%)
Blood and lymphatic system disorders			
<i>Very common</i>			
Thrombocytopenia ^a	146 (29.6)	63 (12.8)	20 (4.0)
Anaemia ^b	245 (49.6)	172 (34.8)	2 (0.4)
Neutropenia ^c	149 (30.2)	77 (15.6)	9 (1.8)
Leucopenia ^d	77 (15.6)	24 (4.9)	1 (0.2)

System organ class Frequency Preferred term	All grades* n (%)	Grade 3 n (%)	Grade 4 n (%)
<i>Common</i> Lymphopenia ^e	30 (6.1)	13 (2.6)	0 (0.0)
Metabolism and nutrition disorders <i>Very common</i> Decreased appetite	100 (20.2)	2 (0.4)	0 (0.0)
Nervous system disorders <i>Very common</i> Dizziness Headache <i>Common</i> Dysgeusia	69 (14.0) 131 (26.5) 42 (8.5)	1 (0.2) 5 (1.0) 0 (0.0)	N/A N/A 0 (0.0)
Gastrointestinal disorders <i>Very common</i> Vomiting Diarrhoea Nausea Abdominal pain ^f <i>Common</i> Stomatitis Dyspepsia	110 (22.3) 112 (22.7) 219 (44.3) 105 (21.3) 32 (6.5) 41 (8.3)	7 (1.4) 3 (0.6) 4 (0.8) 8 (1.6) 0 (0.0) 0 (0.0)	0 (0.0) 0 (0.0) N/A N/A 0 (0.0) N/A
Skin and subcutaneous tissue disorders <i>Very common</i> Alopecia ^g	110 (22.3)	N/A	N/A
General disorders and administration site conditions <i>Very common</i> Fatigue ^h	282 (57.1)	17 (3.4)	1 (0.2)

Abbreviations: n=number of patients; N/A=not applicable.

* There were no Grade 5 adverse drug reactions.

a. Includes preferred terms of thrombocytopenia and platelet count decreased.

b. Includes preferred terms of anaemia, haematocrit decreased and haemoglobin decreased.

c. Includes preferred terms of neutropenia and neutrophil count decreased.

d. Includes preferred terms of leucopenia and white blood cell count decreased.

e. Includes preferred terms of lymphocyte count decreased and lymphopenia.

f. Includes preferred terms of abdominal pain, abdominal pain upper, abdominal discomfort and abdominal pain lower.

g. For talazoparib Grade 1 is 21% and Grade 2 is 2%.

h. Includes preferred terms of fatigue and asthenia.

Description of selected adverse reactions

Myelosuppression

Myelosuppression-related adverse reactions of anaemia, neutropenia, and thrombocytopenia were very commonly reported in patients treated with talazoparib 1 mg/day. Grade 3 and Grade 4 myelosuppression-related events were reported for anaemia 34.8% and 0.4%, neutropenia 15.6% and 1.8%, and thrombocytopenia 12.8% and 4.0%. No deaths were reported due to myelosuppression-related adverse reactions. Myelosuppression-related adverse events associated with dose modifications were reported for up to approximately 30% of patients in the talazoparib 1 mg/day population and those associated with permanent study drug discontinuation were reported for less than 1% of patients.

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.

4.9 Overdose

There is limited experience of overdose with talazoparib. No adverse reactions were reported in one patient who accidentally self-administered thirty 1-mg capsules of talazoparib on Day 1 and was immediately treated with gastric decontamination. Symptoms of overdose are not established. In the event of overdose, treatment with talazoparib should be stopped, and physicians should consider gastric decontamination, follow general supportive measures and treat symptomatically.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: other antineoplastic agents, ATC code: L01XX60

Mechanism of action

Talazoparib is an inhibitor of PARP enzymes, PARP1, and PARP2. PARP enzymes are involved in cellular DNA damage response signalling pathways such as DNA repair, gene transcription, and cell death. PARP inhibitors (PARPi) exert cytotoxic effects on cancer cells by 2 mechanisms, inhibition of PARP catalytic activity and by PARP trapping, whereby PARP protein bound to a PARPi does not readily dissociate from a DNA lesion, thus preventing DNA repair, replication, and transcription, thereby resulting in apoptosis and/or cell death. Treatment of cancer cell lines that are harbouring defects in DNA repair genes with talazoparib single agent leads to increased levels of γ H2AX, a marker of double stranded DNA breaks, and results in decreased cell proliferation and increased apoptosis. Talazoparib anti-tumour activity was also observed in a patient-derived xenograft (PDX) BRCA mutant breast cancer model where the patient was previously treated with a platinum-based regimen. In this PDX model talazoparib decreased tumour growth and increased γ H2AX level and apoptosis in the tumours.

Cardiac electrophysiology

The effect of talazoparib on cardiac repolarisation was evaluated using time-matched electrocardiograms (ECGs) in assessing the relationship between the change of the QT interval corrected for heart rate (QTc) from baseline and the corresponding plasma talazoparib concentrations in 37 patients with advanced solid tumours. Talazoparib did not have a clinically relevant effect on QTc prolongation at the maximum clinically recommended dose of 1 mg once daily.

Clinical efficacy and safety

Randomised Phase 3 study EMBRACA

EMBRACA was an open-label, randomised, parallel, 2-arm multicentre study of Talzenna versus chemotherapy (capecitabine, eribulin, gemcitabine, vinorelbine) in patients with germline BRCA-mutated HER2-negative locally advanced or metastatic breast cancer who received no more than 3 prior cytotoxic chemotherapy regimens for their metastatic or locally advanced disease. Patients were required to have received treatment with an anthracycline and/or a taxane (unless contraindicated) in the neoadjuvant, adjuvant and/or metastatic setting.

Patients with prior platinum therapy for advanced disease were required to have no evidence of disease progression during platinum therapy. No prior treatment with a PARP inhibitor was permitted.

Of the 431 patients randomised in the EMBRACA study, 408 (95%) were centrally confirmed to have a deleterious or suspected deleterious gBRCAm using a clinical trial assay; out of which 354 (82%) were confirmed using the BRACAnalysis CDx[®]. BRCA mutation status (breast cancer susceptibility gene 1 [BRCA1] positive or breast cancer susceptibility gene 2 [BRCA2] positive) was similar across both treatment arms.

A total of 431 patients were randomised 2:1 to receive Talzenna 1 mg capsules once daily or chemotherapy at standard doses until progression or unacceptable toxicity. Of the 431 patients randomised onto EMBRACA, 287 were randomised to the Talzenna arm and 144 to the chemotherapy arm. Randomisation was stratified by prior use of chemotherapy for metastatic disease (0 versus 1, 2, or 3), by triple-negative disease status (triple-negative breast cancer [TNBC] versus non-TNBC), and history of central nervous system metastasis (yes versus no).

Patient demographic, baseline, and disease characteristics were generally similar between the study treatment arms (see Table 4).

Table 4. Demographic, baseline, and disease characteristics – EMBRACA study

	Talazoparib (N=287)	Chemotherapy (N=144)
Median age (y [range])	45.0 (27.0, 84.0)	50.0 (24.0, 88.0)
Age category (y), n (%)		
< 50	182 (63.4%)	67 (46.5%)
50 to < 65	78 (27.2%)	67 (46.5%)
≥ 65	27 (9.4%)	10 (6.9%)
Gender, n (%)		
Female	283 (98.6%)	141 (97.9%)
Male	4 (1.4%)	3 (2.1%)
Race, n (%)		
Asian	31 (10.8%)	16 (11.1%)
Black or African American	12 (4.2%)	1 (0.7%)
White	192 (66.9%)	108 (75.0%)
Other	5 (1.7%)	1 (0.7%)
Not reported	47 (16.4%)	18 (12.5%)
ECOG performance status, n (%)		
0	153 (53.3%)	84 (58.3%)
1	127 (44.3%)	57 (39.6%)
2	6 (2.1%)	2 (1.4%)
Missing	1 (0.3%)	1 (0.7%)
Hormone receptor status, n (%)		
HER2-positive	0 (0.0%)	0 (0.0%)
Triple-negative	130 (45.3%)	60 (41.7%)
Hormone receptor-positive (ER positive or PgR positive)	157 (54.7%)	84 (58.3%)
BRCA status by central or local laboratory assessment, n (%)		
BRCA1-mutation positive	133 (46.3%)	63 (43.8%)
BRCA2-mutation positive	154 (53.7%)	81 (56.3%)
Time from initial diagnosis of breast cancer to diagnosis of advanced breast cancer (years)		

Table 4. Demographic, baseline, and disease characteristics – EMBRACA study

	Talazoparib (N=287)	Chemotherapy (N=144)
n	286	144
Median	1.9	2.7
Minimum, maximum	0, 22	0, 24
Categories for time from initial diagnosis of breast cancer to diagnosis of advanced breast cancer		
< 12 months	108 (37.6%)	42 (29.2%)
≥ 12 months	178 (62.0%)	102 (70.8%)
Number of prior cytotoxic regimens for locally advanced or metastatic disease		
Mean (Std Dev)	0.9 (1.01)	0.9 (0.89)
Median	1	1
Minimum, maximum	0, 4	0, 3
Number of patients who received prior cytotoxic regimens for locally advanced or metastatic disease, n (%)		
0	111 (38.7%)	54 (37.5%)
1	107 (37.3%)	54 (37.5%)
2	57 (19.9%)	28 (19.4%)
3	11 (3.8%)	8 (5.6%)
≥ 4	1 (0.3%)	0 (0.0%)
Number of patients who received following prior therapies, n (%)		
Taxane	262 (91.3%)	130 (90.3%)
Anthracycline	243 (84.7%)	115 (79.9%)
Platinum	46 (16.0%)	30 (20.8%)

Abbreviations: BRCA=breast cancer susceptibility gene; ER=estrogen receptor; HER2=human epidermal growth factor receptor 2; N=number of patients; n=number of patients in category; PgR=progesterone receptor.

The primary efficacy endpoint was progression-free survival (PFS) evaluated according to Response Evaluation Criteria in Solid Tumors (RECIST) version 1.1, as assessed by blinded independent central review (BICR). The secondary objectives were objective response rate (ORR), overall survival (OS), safety, and PK.

The study demonstrated a statistically significant improvement in PFS for Talzenna compared with chemotherapy (see Table 5). The OS interim analysis was performed at 51% for the total number of planned events. Efficacy data for EMBRACA based on the primary analysis as assessed by the independent review and investigator are summarised in Table 5. The Kaplan-Meier curves for PFS is displayed in Figure 1.

Table 5. Summary of efficacy results – EMBRACA study

	Talazoparib	Chemotherapy
Progression-free survival by BICR	N=287	N=144
Events, number (%)	186 (65%)	83 (58%)
Median (95% CI), months	8.6 (7.2, 9.3)	5.6 (4.2, 6.7)
Hazard ratio ^a (95% CI)	0.54 (0.41, 0.71)	
2-sided p-value ^b	p<0.0001	
Overall survival (interim analysis) ^c	N=287	N=144
Events, number (%)	108 (38%)	55 (38%)
Median (95% CI), months	22.3 (18.1, 26.2)	19.5 (16.3, 22.4)
Hazard ratio (95% CI)	0.76 (0.55, 1.06)	
2-sided p-value ^b	p=0.1053	
Objective response by investigator ^{d,e}	N=219	N=114

Table 5. Summary of efficacy results – EMBRACA study

	Talazoparib	Chemotherapy
ORR (% , 95% CI)	62.6 (55.8, 69.0)	27.2 (19.3, 36.3)
Odds ratio (95% CI)	4.99 (2.93, 8.83)	
2-sided p-value ^f	p<0.0001	
Duration of response by investigator ^d	N=137	N=31
Median (IQR), months	5.4 (2.8, 11.2)	3.1 (2.4, 6.7)

Abbreviations: BICR=blinded independent central review; CI=confidence interval; CMH=Cochran-Mantel-Haenszel; CR=complete response; IQR=interquartile range; ITT=intent-to-treat; ORR=objective response rate; OS=overall survival; PR=partial response; RECIST 1.1=Response Evaluation Criteria in Solid Tumors version 1.1.

a. Hazard ratio was based on stratified Cox regression model with treatment as the only covariate (stratification factors: number of prior cytotoxic chemotherapy regimens, triple-negative status, history of central nervous system metastasis) and was relative to overall chemotherapy with < 1 favouring talazoparib.

b. Stratified Log-rank test.

c. 51% of the projected final number of OS events occurred (163 of 321 deaths).

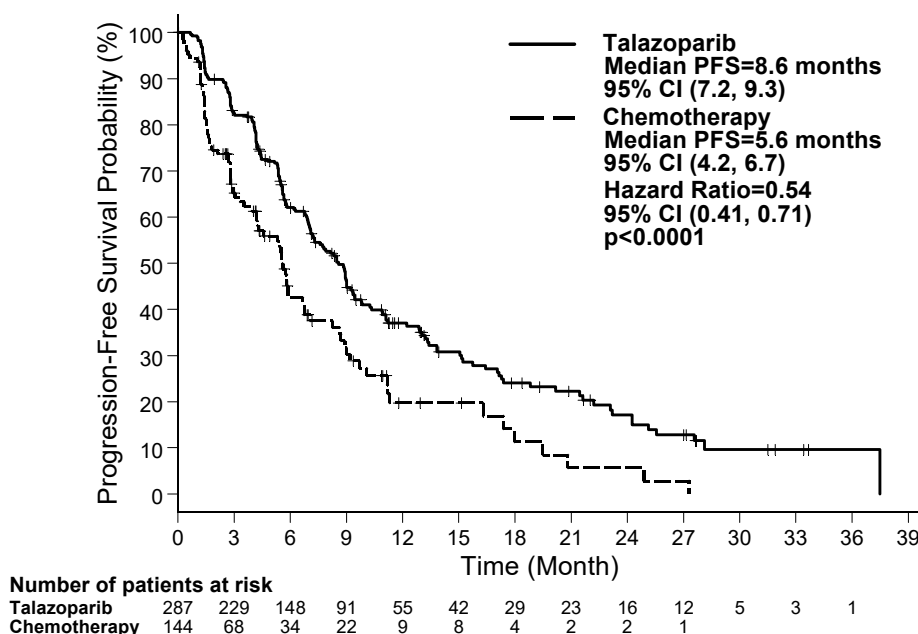
d. Conducted in ITT with measurable disease population who had an objective response. The complete response rate was 5.5% for talazoparib compared to 0% for the chemotherapy arm.

e. Per RECIST 1.1, confirmation of CR/PR was not required.

f. Stratified CMH test.

Figure 1 shows the Kaplan-Meier curve for the EMBRACA study.

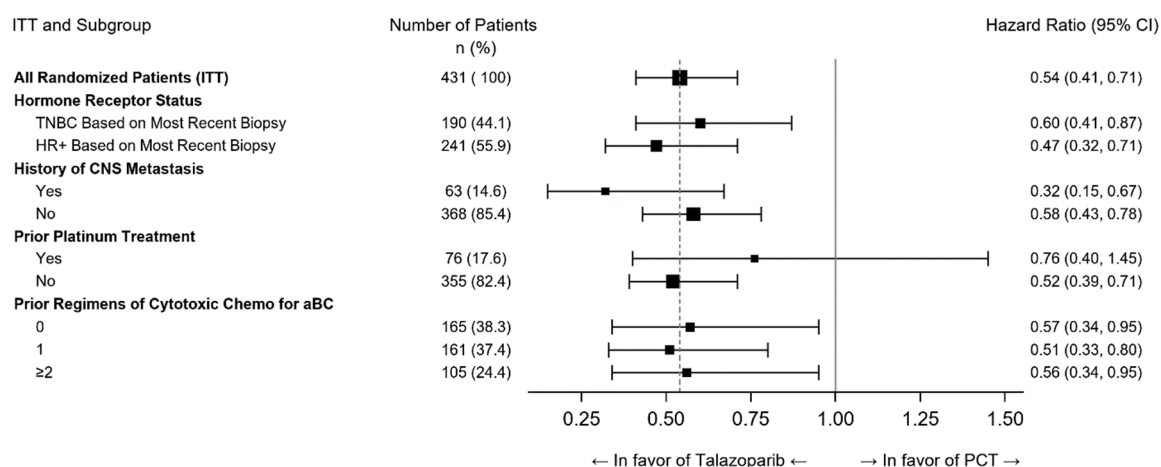
Figure 1. Kaplan-Meier curves of PFS – EMBRACA study



Abbreviations: CI=confidence interval; PFS=progression-free survival.

A series of prespecified subgroup PFS analyses was performed based on prognostic factors and baseline characteristics to investigate the internal consistency of treatment effect. Consistent with the overall results, a reduction in the risk of disease progression or death in favour of the talazoparib arm was observed in all individual patient subgroups (Figure 2).

Figure 2. Forest plot of PFS analyses for key subgroups – EMBRACA study



Abbreviations: aBC=advanced breast cancer; CI=confidence interval; CNS=central nervous system; HR+=hormone receptor-positive; ITT=intent-to-treat; PCT=physician’s choice treatment (chemotherapy); PFS=progression-free survival; TNBC=triple-negative breast cancer.

5.2 Pharmacokinetic properties

Talazoparib exposure generally increased proportionally with dose across the range of 0.025 mg to 2 mg after daily administration of multiple doses. Following repeated daily dosing of 1 mg talazoparib to patients, the geometric mean (% coefficient of variation [CV%]) area under the plasma concentration-time curve (AUC) and maximum observed plasma concentration (C_{max}) of talazoparib at steady-state was in the range of 126 (107) ng•hr/mL to 208 (37) ng•hr/mL and 11 (90) ng/mL to 19 (27) ng/mL, respectively. Following repeated daily dosing, plasma talazoparib concentrations reached steady-state within 2 to 3 weeks. The median accumulation ratio of talazoparib following repeated oral administration of 1 mg once daily was in the range of 2.3 to 5.2. Talazoparib is a substrate of P-gp and BCRP transporters.

Absorption

Following oral administration of talazoparib, the median time to C_{max} (T_{max}) was generally between 1 to 2 hours after dosing. The absolute bioavailability study has not been conducted in humans. However, based on urinary excretion data the absolute bioavailability is at least 41% with fraction absorbed of at least 69% (see Elimination). No significant effect of acid-reducing agents on talazoparib exposure is expected, given sufficient solubility of talazoparib at all pHs between 1 and 6.8. Twenty-eight percent (28%) of the patients in the pivotal study were taking acid-reducing agents, mainly proton pump inhibitors.

The effect of food

Food intake decreased the rate but not the extent of talazoparib absorption. Following a single oral dose of talazoparib with high-fat, high-calorie food (approximately 827 calories, 57% fat), the mean C_{max} of talazoparib was decreased by approximately 46%, the median T_{max} was delayed from 1 to 4 hours, while the AUC_{inf} was not affected. Based on these results, Talzenna can be administered with or without food (see section 4.2).

Distribution

The population mean apparent volume of distribution (V_{ss}/F) of talazoparib was 420 L. *In vitro*, talazoparib is approximately 74% bound to plasma proteins with no concentration dependence over the concentration range of 0.01 μ M to 1 μ M.

Biotransformation

Talazoparib undergoes minimal hepatic metabolism in humans. Following oral administration of a single 1 mg dose of [14 C]talazoparib to humans, no major circulating metabolites were identified in plasma, and talazoparib was the only circulating drug-derived entity identified. No metabolites that individually represented more than 10% of the administered dose were recovered in the urine or faeces.

In vitro, talazoparib was not an inhibitor of cytochrome (CYP)1A2, CYP2B6, CYP2C8, CYP2C9, CYP2C19, CYP2D6, or CYP3A4/5 or inducer of CYP1A2, CYP2B6, or CYP3A4 at clinically relevant concentrations.

In vitro, talazoparib did not inhibit any of the major intestinal, hepatic or renal membrane transporters (P-gp, BCRP, organic anion transporting polypeptide [OATP]1B1, OATP1B3, organic cationic transporter [OCT]1, OCT2, organic anion transporter [OAT]1, OAT3, bile salt export pump [BSEP], multidrug and toxin extrusion [MATE]1 and MATE2-K) at clinically relevant concentrations.

In vitro, talazoparib did not inhibit any of the major uridine-diphosphate glucuronosyltransferase (UGT) isoforms (1A1, 1A4, 1A6, 1A9, 2B7, and 2B15) at clinically relevant concentrations.

Elimination

Renal elimination of unchanged drug (passive filtration and active secretion) is the major route of talazoparib elimination. P-gp is likely involved in talazoparib active renal secretion. The mean (\pm standard deviation) terminal plasma half-life of talazoparib was 90 (\pm 58) hours and the population mean (inter-subject variability) apparent oral clearance (CL/F) was 6.5 (31%) L/h in cancer patients. In 6 female patients given a single oral dose of [14 C]talazoparib, a mean of 69% (\pm 8.6%) and 20% (\pm 5.5%) of the total administered radioactive dose was recovered in urine and faeces, respectively. Excretion of unchanged talazoparib in urine was the major route of elimination accounting for 55% of the administered dose, while unchanged talazoparib recovered in the faeces accounted for 14%.

Age, sex, and body weight

A population PK analysis was conducted using data from 490 patients with cancer to evaluate the impact of age (ranging from 18 to 88 years), sex (53 males and 437 females), and body weight (ranging from 35.7 kg to 162 kg) on the PK of talazoparib. The results have shown that age, sex, and body weight had no clinically relevant effect on the PK of talazoparib.

Race

Based on a population PK analysis that included 490 patients, where 41 patients were Asian and 449 patients were Non-Asian (361 White, 16 Black, 9 Others, and 63 Not reported), talazoparib CL/F was higher in Asian patients compared to Non-Asian patients, leading to 19% lower exposure (AUC) in Asian patients.

Paediatric population

Pharmacokinetics of talazoparib have not been evaluated in patients < 18 years of age.

Renal impairment

Based on a population PK analysis that included 490 patients, where 132 patients had mild renal impairment ($60 \text{ mL/min} \leq \text{CrCL} < 90 \text{ mL/min}$), 33 patients had moderate renal impairment ($30 \text{ mL/min} \leq \text{CrCL} < 60 \text{ mL/min}$), and 1 patient had severe renal impairment ($\text{CrCL} < 30 \text{ mL/min}$), talazoparib CL/F was decreased by 14% and 37% in patients with mild and moderate renal impairment, respectively, when compared to patients with normal renal function ($\text{CrCL} \geq 90 \text{ mL/min}$). Insufficient data are available to estimate the impact of severe renal impairment on talazoparib CL/F in this patient population. The PK of talazoparib have not been studied in patients requiring haemodialysis (see section 4.2).

Hepatic impairment

Based on a population PK analysis that included 490 patients, where 118 patients had mild hepatic impairment (total bilirubin $\leq 1.0 \times \text{ULN}$ and $\text{AST} > \text{ULN}$, or total bilirubin > 1.0 to $1.5 \times \text{ULN}$ and any AST), mild hepatic impairment had no effect on the PK of talazoparib. The PK of talazoparib have not been studied in patients with moderate (total bilirubin > 1.5 to $3.0 \times \text{ULN}$ and any AST) or severe hepatic impairment (total bilirubin $> 3.0 \times \text{ULN}$ and any AST) (see section 4.2).

5.3 Preclinical safety data

Carcinogenicity

Carcinogenicity studies have not been conducted with talazoparib.

Genotoxicity

Talazoparib was not mutagenic in a bacterial reverse mutation (Ames) test. Talazoparib was clastogenic in an *in vitro* chromosomal aberration assay in human peripheral blood lymphocytes and in an *in vivo* micronucleus assay in rats at exposures similar to clinically relevant doses. This clastogenicity is consistent with genomic instability resulting from the primary pharmacology of talazoparib, indicating the potential for genotoxicity in humans.

Repeat-dose toxicity

In repeat-dose toxicity studies in rats and in dogs, the main findings at subtherapeutic exposures included bone marrow hypocellularity with dose-dependent decrease in haematopoietic cells, depletion of lymphoid tissue in multiple organs and atrophy and/or degenerative changes in testes, epididymis and seminiferous tubules. Additional findings at higher exposures included dose-dependent increase in apoptosis/necrosis in the gastrointestinal (GI) tract, liver and ovary. Most of the histopathologic findings were generally reversible while the testes findings were partially reversible after 4 weeks of dosing cessation. These toxicity findings are consistent with the pharmacology of talazoparib and its tissue distribution pattern.

Developmental toxicology

In an embryo-foetal development study in rats, talazoparib resulted in embryo-foetal death, foetal malformation (depressed eye bulge, small eye, split sternebrae, fused cervical vertebral arch) and structural variations in bones at a maternal systemic AUC_{24} exposure approximately 0.09-fold the relevant human exposure at the recommended dose.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Capsule content

Silicified microcrystalline cellulose (sMCC) (microcrystalline cellulose and silicone dioxide)

0.25 mg capsule shell

Hypromellose (HPMC)
Yellow iron Oxide (E172)
Titanium dioxide (E171)

1 mg capsule shell

Hypromellose (HPMC)
Red iron oxide (E172)
Yellow iron oxide (E172)
Titanium dioxide (E171)

Printing ink

Shellac (E904)
Propylene glycol (E1520)
Ammonium hydroxide (E527)
Black iron oxide (E172)
Potassium hydroxide (E525)

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

Please refer to the outer carton for the expiry date.

6.4 Special precautions for storage

Please refer to the outer carton for the storage condition.

6.5 Special precautions for disposal

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

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Hong Kong