NEWS RELEASE

LYNPARZA® (olaparib) Receives Approval in Japan for the Treatment of Advanced Ovarian Cancer

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LYNPARZA is the First PARP Inhibitor Approved in Japan

LYNPARZA Tablets Approved as Maintenance Treatment for Women with Platinum-Sensitive Relapsed Ovarian Cancer Regardless of BRCA Mutation Status

AstraZeneca and Merck (NYSE:MRK), known as MSD outside the United States and Canada, today announced that the Japanese Ministry of Health, Labour and Welfare has approved LYNPARZA ® (olaparib) tablets (300mg twice daily) for use as a maintenance therapy for patients with platinum-sensitive relapsed ovarian cancer, regardless of their BRCA mutation status, who responded to their last platinum-based chemotherapy. LYNPARZA is the first poly ADP-ribose polymerase (PARP) inhibitor to be approved in Japan.

Dave Fredrickson, executive vice president, head of the oncology business unit at AstraZeneca, said, “We are proud to bring this important first-in-class treatment to women with platinum-sensitive relapsed ovarian cancer in Japan who currently have very few treatment options. The trials show that with LYNPARZA maintenance therapy, women with ovarian cancer can live longer without their disease worsening and LYNPARZA is well tolerated.”

Dr. Roy Baynes, senior vice president and head of global clinical development, chief medical officer, Merck Research Laboratories, said, “Today’s decision is significant for LYNPARZA and, more importantly, for Japanese patients living with advanced ovarian cancer. Our global collaboration with AstraZeneca further reinforces how our joint efforts can advance science for patients and we look forward to working together to explore the potential of LYNPARZA across multiple tumor types.”

The approval was granted on the basis of two randomized trials of LYNPARZA (olaparib) maintenance therapy for platinum-sensitive relapsed ovarian cancer, SOLO-2 and Study 19.

Table 1. Summary of key efficacy results from randomized trials:

Analysis		Reduction in the risk of disease progression or death (PFS)	Reduction in the risk of death (OS)
SOLO-2 [gBRCAm] n=295	LYNPARZA Placebo	70% (HR 0.30 [95% CI, 0.22-0.41], P<0.0001; median 19.1 vs 5.5 months by investigator-assessed analysis)	Data not yet mature
Study 19 [PSR OC*] n=265	LYNPARZA Placebo	65% (HR 0.35 [95% CI, 0.25-0.49], P<0.0001; median 8.4 vs 4.8 months)	27% (HR 0.73 [95% CI, 0.55-0.95]; median 29.8 vs 27.8 months)

*PSR = Platinum-sensitive recurrent ovarian cancer

In SOLO-2, the most common adverse drug reactions (≥20%) of any grade reported in patients in the LYNPARZA arm were nausea (66.7%), anemia (39.0%), fatigue (29.7%), vomiting (25.6%), asthenia (24.1%) and dysgeusia (23.1%).

In Study 19, the most common adverse drug reactions (≥20%) of any grade reported in patients in the LYNPARZA arm were nausea (64.0%), fatigue (43.4%) and vomiting (21.3%).

LYNPARZA is also currently under review for use in unresectable or recurrent BRCA-mutated HER2-negative breast cancer in Japan, with a decision expected in the second half of 2018 based upon a priority review.

About Ovarian Cancer in Japan

Worldwide, ovarian cancer is the seventh most-commonly diagnosed cancer and the eighth most-common cause of cancer deaths in women. In Japan, more than 9,000 women are diagnosed with ovarian cancer every year and the five-year survival rate is 58 percent, the lowest among all gynecological cancers. In 2012, 4,758 women with ovarian cancer died, which represents one out of every two patients. As there is no cure for relapsed ovarian cancer, the primary aim of treatment is to slow progression of the disease for as long as possible and improving or maintaining a patient's quality of life.

Indications for LYNPARZA (olaparib) in the U.S.

LYNPARZA is a poly (ADP-ribose) polymerase (PARP) inhibitor indicated:

For the maintenance treatment of adult patients with recurrent epithelial ovarian, fallopian tube, or primary peritoneal cancer, who are in complete or partial response to platinum-based chemotherapy.

For the treatment of adult patients with deleterious or suspected deleterious germline BRCA-mutated (gBRCAm) advanced ovarian cancer who have been treated with 3 or more prior lines of chemotherapy. Select patients for therapy based on an FDA-approved companion diagnostic for LYNPARZA.

In patients with deleterious or suspected deleterious gBRCAm, human epidermal growth factor receptor 2 (HER2)-negative metastatic breast cancer who have previously been treated with chemotherapy in the neoadjuvant, adjuvant or metastatic setting. Patients with hormone receptor (HR)-positive breast cancer should have been treated with a prior endocrine therapy or be considered inappropriate for endocrine treatment. Select patients for therapy based on an FDA-approved companion diagnostic for LYNPARZA.

Important Safety Information for LYNPARZA ® (olaparib)

Contraindications

There are no contraindications for LYNPARZA.

Warnings and Precautions

Myelodysplastic Syndrome/Acute Myeloid Leukemia (MDS/AML): Occurred in <1.5% of patients exposed to LYNPARZA monotherapy, and the majority of events had a fatal outcome. The duration of therapy in patients who developed secondary MDS/AML varied from <6 months to >2 years. All of these patients had previous chemotherapy with platinum agents and/or other DNA-damaging agents, including radiotherapy, and some also had a history of more than one primary malignancy or of bone marrow dysplasia.

Do not start LYNPARZA until patients have recovered from hematological toxicity caused by previous chemotherapy (≤Grade 1). Monitor complete blood count for cytopenia at baseline and monthly thereafter for clinically significant changes during treatment. For prolonged hematological toxicities, interrupt LYNPARZA and monitor blood count weekly until recovery.

If the levels have not recovered to Grade 1 or less after 4 weeks, refer the patient to a hematologist for further

investigations, including bone marrow analysis and blood sample for cytogenetics. Discontinue LYNPARZA (olaparib) if MDS/AML is confirmed.

Pneumonitis: Occurred in <1% of patients exposed to LYNPARZA, and some cases were fatal. If patients present with new or worsening respiratory symptoms such as dyspnea, cough, and fever, or a radiological abnormality occurs, interrupt LYNPARZA treatment and initiate prompt investigation. Discontinue LYNPARZA if pneumonitis is confirmed and treat patient appropriately.

Embryo-Fetal Toxicity: Based on its mechanism of action and findings in animals, LYNPARZA can cause fetal harm. A pregnancy test is recommended for females of reproductive potential prior to initiating treatment. Advise females of reproductive potential of the potential risk to a fetus and to use effective contraception during treatment and for 6 months following the last dose. Advise male patients with female partners of reproductive potential or who are pregnant to use effective contraception during treatment and for 3 months following the last dose of LYNPARZA and to not donate sperm during this time.

Adverse Reactions—Maintenance Setting

Most common adverse reactions (Grades 1-4) in ≥20% of patients in clinical trials of LYNPARZA (olaparib) in the maintenance setting for SOLO-2: nausea (76%), fatigue (including asthenia) (66%), anemia (44%), vomiting (37%), nasopharyngitis/upper respiratory tract infection (URI)/influenza (36%), diarrhea (33%), arthralgia/myalgia (30%), dysgeusia (27%), headache (26%), decreased appetite (22%), and stomatitis (20%).

Study 19: nausea (71%), fatigue (including asthenia) (63%), vomiting (35%), diarrhea (28%), anemia (23%), respiratory tract infection (22%), constipation (22%), headache (21%), and decreased appetite (21%).

Most common laboratory abnormalities (Grades 1-4) in ≥25% of patients in clinical trials of LYNPARZA in the maintenance setting (SOLO-2/Study 19) were: increase in mean corpuscular volume (89%/82%), decrease in hemoglobin (83%/82%), decrease in leukocytes (69%/58%), decrease in lymphocytes (67%/52%), decrease in absolute neutrophil count (51%/47%), increase in serum creatinine (44%/45%), and decrease in platelets (42%/36%).

Adverse Reactions—Advanced gBRCAm Ovarian Cancer

Most common adverse reactions (Grades 1-4) in ≥20% of patients in clinical trials of LYNPARZA (olaparib) for advanced gBRCAm ovarian cancer after 3 or more lines of chemotherapy (pooled from 6 studies) were: fatigue (including asthenia) (66%), nausea (64%), vomiting (43%), anemia (34%), diarrhea (31%), nasopharyngitis/upper respiratory tract infection (URI) (26%), dyspepsia (25%), myalgia (22%), decreased appetite (22%), and arthralgia/musculoskeletal pain (21%).

Most common laboratory abnormalities (Grades 1-4) in ≥25% of patients in clinical trials of LYNPARZA for advanced gBRCAm ovarian cancer (pooled from 6 studies) were: decrease in hemoglobin (90%), increase in mean corpuscular volume (57%), decrease in lymphocytes (56%), increase in serum creatinine (30%), decrease in platelets (30%), and decrease in absolute neutrophil count (25%).

Adverse Reactions—gBRCAm, HER2-Negative Breast Cancer

Most common adverse reactions (Grades 1-4) in ≥20% of patients in OlympiAD were: nausea (58%), anemia (40%), fatigue (including asthenia) (37%), vomiting (30%), neutropenia (27%), respiratory tract infection (27%), leukopenia (25%), diarrhea (21%), and headache (20%).

Most common laboratory abnormalities (Grades 1-4) in ≥25% of patients in OlympiAD were: decrease in hemoglobin (82%), decrease in lymphocytes (73%), decrease in leukocytes (71%), increase in mean corpuscular volume (71%), decrease in absolute neutrophil count (46%), and decrease in platelets (33%).

Drug Interactions

Anticancer Agents: Clinical studies of LYNPARZA in combination with other myelosuppressive anticancer agents, including DNA-damaging agents, indicate a potentiation and prolongation of myelosuppressive toxicity.

CYP3A Inhibitors: Avoid concomitant use of strong or moderate CYP3A inhibitors. If a strong or moderate CYP3A inhibitor must be co-administered, reduce the dose of LYNPARZA. Advise patients to avoid grapefruit, grapefruit juice, Seville oranges, and Seville orange juice during LYNPARZA treatment.

CYP3A Inducers: Avoid concomitant use of strong or moderate CYP3A inducers when using LYNPARZA (olaparib). If a moderate inducer cannot be avoided, there is a potential for decreased efficacy of LYNPARZA.

Use In Specific Populations

Lactation: No data are available regarding the presence of olaparib in human milk, its effects on the breastfed infant or on milk production. Because of the potential for serious adverse reactions in the breastfed infant, advise a lactating woman not to breastfeed during treatment with LYNPARZA and for 1 month after receiving the final dose.

Pediatric Use: The safety and efficacy of LYNPARZA have not been established in pediatric patients.

Hepatic Impairment: No adjustment to the starting dose is required in patients with mild hepatic impairment

(Child-Pugh classification A). There are no data in patients with moderate or severe hepatic impairment.

Renal Impairment: No adjustment to the starting dose is necessary in patients with mild renal impairment (CLcr=51-80 mL/min). In patients with moderate renal impairment (CLcr=31-50 mL/min), reduce the dose to 200 mg twice daily. There are no data in patients with severe renal impairment or end-stage renal disease (CLcr ≤30 mL/min).

Dosing and Administration

To avoid substitution errors and overdose, do not substitute LYNPARZA (olaparib) tablets with LYNPARZA capsules on a milligram-to-milligram basis due to differences in the dosing and bioavailability of each formulation. Recommended tablet dose is 300 mg, taken orally twice daily, with or without food. Continue treatment until disease progression or unacceptable toxicity. For adverse reactions, consider dose interruption or dose reduction.

NOTES TO EDITORS

About SOLO-2

SOLO-2 was a phase 3, randomized, double-blinded, multicenter trial designed to determine the efficacy of LYNPARZA tablets as a maintenance monotherapy compared with placebo, in patients with platinum-sensitive, relapsed or recurrent gBRCA-mutated ovarian, fallopian tube and primary peritoneal cancer. The trial, conducted in collaboration with the European Network for Gynaecological Oncological Trial Groups (ENGOT) and Groupe d'Investigateurs National pour l'Etude des Cancers de l'Ovaire et du sein (GINECO), randomized 295 patients with documented germline BRCA1 or BRCA2 mutations who had received at least two prior lines of platinum-based chemotherapy and were in complete or partial response. Eligible patients were randomized to receive 300mg LYNPARZA (olaparib) tablets twice daily or placebo tablets twice daily.

About Study 19

Study 19 was a phase II, randomized, double-blinded, placebo-controlled, multicenter trial, which evaluated the efficacy and safety of LYNPARZA compared with placebo in relapsed, high-grade serous ovarian cancer patients. The trial randomized 265 patients regardless of BRCA mutation status and who had completed at least two courses of platinum-based chemotherapy and their most recent treatment regimen. Eligible patients were randomized to receive LYNPARZA maintenance monotherapy at a dose of 400mg per day or matching placebo.

About LYNPARZA® (olaparib)

LYNPARZA is a first-in-class poly ADP-ribose polymerase (PARP) inhibitor and the first targeted treatment to potentially exploit tumor DNA damage response (DDR)-pathway deficiencies to preferentially kill cancer cells. Specifically, in vitro studies have shown that LYNPARZA-induced cytotoxicity may involve inhibition of PARP enzymatic activity and increased formation of PARP-DNA complexes, resulting in DNA damage and cancer cell death.

LYNPARZA is being investigated in a range of DDR-deficient tumor types.

About the AstraZeneca and Merck Strategic Oncology Collaboration

In July 2017, AstraZeneca and Merck announced a global strategic oncology collaboration to co-develop and co-commercialize LYNPARZA, the world's first PARP inhibitor, and potential new medicine selumetinib, a MEK inhibitor, for multiple cancer types. The collaboration is based on increasing evidence that PARP and MEK inhibitors can be combined with PD-L1/PD-1 inhibitors for a range of tumor types. Working together, the companies will develop LYNPARZA and selumetinib in combination with other potential new medicines and as a monotherapy. Independently, the companies will develop LYNPARZA and selumetinib in combination with their respective PD-L1 and PD-1 medicines.

Merck's Focus on Cancer

Our goal is to translate breakthrough science into innovative oncology medicines to help people with cancer worldwide. At Merck, helping people fight cancer is our passion and supporting accessibility to our cancer medicines is our commitment. Our focus is on pursuing research in immuno-oncology and we are accelerating every step in the journey – from lab to clinic – to potentially bring new hope to people with cancer.

As part of our focus on cancer, Merck is committed to exploring the potential of immuno-oncology with one of the fastest-growing development programs in the industry. We are currently executing an expansive research program evaluating our anti-PD-1 therapy across more than 30 tumor types. We also continue to strengthen our immuno-oncology portfolio through strategic acquisitions and are prioritizing the development of several promising immunotherapeutic candidates with the potential to improve the treatment of advanced cancers.

For more information about our oncology clinical trials, visit **www.merck.com/clinicaltrials**.

About Merck

For more than a century, Merck, a leading global biopharmaceutical company known as MSD outside of the United States and Canada, has been inventing for life, bringing forward medicines and vaccines for many of the world's

most challenging diseases. Through our prescription medicines, vaccines, biologic therapies and animal health products, we work with customers and operate in more than 140 countries to deliver innovative health solutions. We also demonstrate our commitment to increasing access to health care through far-reaching policies, programs and partnerships. Today, Merck continues to be at the forefront of research to advance the prevention and treatment of diseases that threaten people and communities around the world - including cancer, cardio-metabolic diseases, emerging animal diseases, Alzheimer's disease and infectious diseases including HIV and Ebola. For more information, visit **www.merck.com** and connect with us on **Twitter**, **Facebook**, **Instagram**, **YouTube** and **LinkedIn**.

Forward-Looking Statement of Merck & Co., Inc., Kenilworth, N.J., USA

This news release of Merck & Co., Inc., Kenilworth, N.J., USA (the "company") includes "forward-looking statements" within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. These statements are based upon the current beliefs and expectations of the company's management and are subject to significant risks and uncertainties. There can be no guarantees with respect to pipeline products that the products will receive the necessary regulatory approvals or that they will prove to be commercially successful. If underlying assumptions prove inaccurate or risks or uncertainties materialize, actual results may differ materially from those set forth in the forward-looking statements.

Risks and uncertainties include but are not limited to, general industry conditions and competition; general economic factors, including interest rate and currency exchange rate fluctuations; the impact of pharmaceutical industry regulation and health care legislation in the United States and internationally; global trends toward health care cost containment; technological advances, new products and patents attained by competitors; challenges inherent in new product development, including obtaining regulatory approval; the company's ability to accurately predict future market conditions; manufacturing difficulties or delays; financial instability of international economies and sovereign risk; dependence on the effectiveness of the company's patents and other protections for innovative products; and the exposure to litigation, including patent litigation, and/or regulatory actions.

The company undertakes no obligation to publicly update any forward-looking statement, whether as a result of new information, future events or otherwise. Additional factors that could cause results to differ materially from those described in the forward-looking statements can be found in the company's 2016 Annual Report on Form 10-K and the company's other filings with the Securities and Exchange Commission (SEC) available at the SEC's Internet site (**www.sec.gov**).

Please see complete **Prescribing Information** for LYNPARZA (olaparib), including Patient Information (Medication Guide)

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