UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MERCK SHARP & DOHME LLC,
Petitioner

v.

THE JOHNS HOPKINS UNIVERSITY,
Patent Owner

Patent No. 11,325,974

Inter Partes Review No. IPR2024-00623

REBUTTAL DECLARATION OF SEAN SHERIDAN, PH.D.

May 1, 2025

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I. INTRODUCTION

A. Qualifications

1. My name is Sean Sheridan, and I am a Vice President in the Intellectual Property practice at Charles River Associates ("CRA") in its Chicago office.

2. CRA is an international business consulting firm focusing on, among other things, intellectual property matters in the context of strategy, licensing, valuation, and litigation consulting. CRA provides expert testimony on commercial success, compensatory damages, and other areas requiring accounting, financial, and economic expertise. Outside of litigation, CRA performs valuations for transactional, business decision-making, and regulatory purposes. CRA also provides strategic consulting services to help companies align their intellectual property strategy and investments with overall business strategy.

3. My consulting work has been primarily related to the valuation and strategic management of intellectual property assets. I have valued intellectual property rights in connection with litigation, licensing, divestitures, and acquisitions, and in a variety of other contexts. I

have advised clients throughout the intellectual property commercialization process, including strategy development, financial modeling, and transaction negotiation. My work on litigation matters has involved the evaluation of commercial success, the quantification of economic damages, and assessment of domestic industry. I have taught workshops and spoken on the subject of intellectual property valuation in a variety of forums and have been selected to the IAM Patent 1000 – The World's Leading Patent Professionals (as a recommended economic expert) every year since 2019, based on nominations from industry participants.

4. Prior to my work as a consultant, I was an assistant director at the technology transfer office at the University of Chicago. In that role, I was responsible for managing the intellectual property strategy for a broad portfolio of technologies, primarily in the life sciences field. I also personally negotiated numerous contracts including license agreements, option agreements, and collaboration agreements with companies ranging from Fortune 500 firms to small start-ups. I was also frequently required to assess the value of technology portfolios and potential licensed products. My curriculum vitae is attached hereto as Schedule 1.0.

5. CRA is being compensated on a rate-times-hours basis for the work I and individuals working under my supervision perform. My billing rate for this matter is $850 per hour, and those working at my direction have lower billing rates. CRA's compensation does not depend in any way on the outcome of this *Inter Partes* Review proceeding.

B. Assignment

6. I have been retained by counsel for Petitioner Merck Sharp & Dohme LLC ("Merck") in IPR2024-00623, which I understand concerns U.S. Patent No. 11,325,974 (the "'974 Patent").

7. I have been asked to offer my opinions, based on my knowledge, experience and analysis of information available in these proceedings, about whether the commercial performance of Keytruda (pembrolizumab) when used to treat patients with microsatellite instability-high or mismatch repair deficient (MSI-H/dMMR) solid tumors that have progressed following prior treatment has a nexus to the methods claimed in the '974 Patent. I have also been asked to review and respond to the Declaration of Brian J. Segers dated January 12, 2025 (EX2191) which was submitted on behalf of The Johns Hopkins University ("JHU"). It is my understanding that JHU

bears the evidentiary burden in establishing commercial success as a secondary consideration of nonobviousness, and for the reasons discussed below, it is my opinion that neither JHU nor Mr. Segers have met this burden.

C. Information Reviewed or Relied Upon

8. In performing my analysis and forming the opinions expressed in this report, my staff and I reviewed and/or relied upon various documents produced by Merck and publicly available information. The documents reviewed and/or relied upon by me and those under my direction are listed in Schedule 2.0 and referenced in the text, footnotes, and attached exhibits of this report. In addition, I had a discussion with Merck declarant Dr. Paul E. Oberstein, who is a practicing clinical oncologist.

9. I may supplement and/or amend my opinion to reflect information made available to me subsequent to the issuance of this report.

II. SUMMARY OF CONCLUSIONS

10. Based on my analysis of information gathered during the course of my work in this matter, it is my opinion that there is no evidence of a nexus between the challenged claims of the ’974 Patent and the

commercial performance of Keytruda's use as a treatment for MSI-H/dMMR cancers after a prior cancer therapy. Additionally, Mr. Segers presents a flawed and misleading analysis which does not support any secondary consideration of nonobviousness of the '974 Patent claims.

III. BACKGROUND

A. Market Overview

1. Immune Checkpoint Inhibitors

11. I understand from Merck declarant Dr. Alfred I. Neugut, a practicing oncologist, that pembrolizumab (Keytruda) is a type of PD-1 inhibitor, which are a type of immunotherapy called checkpoint inhibitors. (EX1003, ¶¶30-33.) I also understand that PD-1 inhibitors boost the immune system in a specific way, and that they fight cancer by preventing the PD-1/PD-L1 interaction between T-cells and cancer cells from occurring. (EX1003, ¶¶30-33.) According to Dr. Neugut, this interaction "uncloaks the cancer cells, making them susceptible to recognition and removal by T-cells." (EX1003, ¶33.)

12. Current FDA-approved immune checkpoint inhibitors include the products listed in the following figure:

Figure 1: FDA-Approved Immune Checkpoint Inhibitors

Checkpoint Inhibitors	FDA Approved Products
PD-1 inhibitors	Keytruda (pembrolizumab) Opdivo (nivolumab) Libtayo (cemiplimab) Zynyz (retifanlimab-dlwr) Jemperli (dostarlimab) Loqtorzi (toripalimab)
PD-L1 inhibitors	Tecentriq (atezolizumab) Tecentriq Hybreza (atezolizumab and hyaluronidase-tqjs) Bavencio (avelumab) Imfinzi (durvalumab)
CTLA-4 inhibitors	Yervoy (ipilimumab) Imjudo (tremelimumab)
LAG-3 inhibitors	Opdualag[1] (nivolumab and relatlimab-rmbw)

(EX1152-1155; EX2203.)

2. Keytruda Overview

13. According to Merck, "Keytruda is an anti-programmed death receptor-1 (PD-1) therapy that works by increasing the ability of the body's immune system to help detect and fight tumor cells. Keytruda is a humanized monoclonal antibody that blocks the interaction

[1] Opdualag is a combination of a LAG-3 inhibitor and a PD-1 inhibitor.

between PD-1 and its ligands, PD-L1 and PD-L2, thereby activating T lymphocytes which may affect both tumor cells and healthy cells." (EX1156.)

14. On February 27, 2014, Merck submitted Biologics License Application ("BLA") 125514 for Keytruda (pembrolizumab) for the treatment of patients with unresectable or metastatic melanoma and disease progression following ipilimumab and, if BRAF V600 mutation positive, a BRAF inhibitor. (EX1169.) Keytruda achieved Breakthrough Therapy Designation status from the FDA, and on September 4, 2014, was granted accelerated approval. (EX1169.) Merck subsequently launched Keytruda that same month. (EX2187.)

15. On May 23, 2017, Keytruda received accelerated FDA approval for the treatment of patients with "unresectable or metastatic, microsatellite instability-high (MSI-H) or mismatch repair deficient solid tumors that have progressed following prior treatment and who have no satisfactory alternative treatment options, or metastatic, microsatellite instability-high (MSI-H) or mismatch repair deficient colorectal cancer that has progressed following treatment with a fluoropyrimidine, oxaliplatin, and irinotecan." (EX1165.) Keytruda's

accelerated approval to treat patients with unresectable or metastatic, MSI-H/dMMR solid tumors that have progressed following prior treatment and who have no satisfactory alternative treatment options was converted to a full approval in March 2023. (EX1249.)

16. Merck has invested considerable resources into Keytruda and has even moved scientists and funds from other projects to support the drug's development. (EX1158.) As a result of these investments, Keytruda has received more than 50 FDA approvals and is indicated to treat a variety of different types of cancer, as summarized in the following figure.

Figure 2: Keytruda FDA Approvals by Indication – 2014 to Present[2]

Tumor Type	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Melanoma	X	X				X		X			
NSCLC		X	X	X	XX	X				XX	
HNSCC			X			XX					
cHL				X			XX				
Bladder				XX			X			XXX	
MSI-H/dMMR CRC				X			X				
MSI-H/dMMR				X							
Gastric								X		X	
Cervical					X			XX			X
PMBCL					X						
HCC					X						
MCC					X						
RCC						X		XX			
Esophageal						X		X			
Endometrial						X		X	X		X
TMB-H							X				
cSCC							X	X			
TNBC							X	XX			
Biliary										X	
MPM											X

(Schedule 7.0.)

17. Additionally, according to the NCI, off-label use of drugs (i.e., prescribing a drug for a different purpose than what the FDA approved) is very common in cancer treatment. (EX1206.) According to an analysis conducted by researchers at the University of Chicago in which private insurance, Medicare, and Medicaid claims

[2] Each 'X' represents a Keytruda FDA approval. (EX1159-1205.) When there were multiple Keytruda FDA approval letters for an indication in a given year, or multiple approved indications included in a single letter, multiple 'X' marks have been indicated. This figure excludes all approvals that were subsequently withdrawn by the FDA.

from January 2015 to September 2016 were reviewed, approximately one-third of patients (292 out of 871 patients) who put in claims for Keytruda were taking the drug for an off-label use. (EX1207.)

3. Treatments of MSI-H After a Prior Cancer Therapy

18. I understand from Dr. Neugut that a patient's cancer is considered microsatellite instability high ("MSI-H") if the cancer cells' DNA contains small tracts of repeating DNA ("microsatellites") that are different sizes than the regularly occurring microsatellites. (EX1003, ¶¶27-29.) I also understand that MSI-H is caused by mismatch repair deficiency ("dMMR") where the cell's mismatch repair proteins are nonfunctional and spontaneous mutations in the DNA are therefore not repaired. (EX1003, ¶¶27-29.) According to Dr. Neugut, "MSI-H and dMMR are 'biologically the same.'" (EX1003, ¶29.)

19. According to the current National Comprehensive Cancer Network Guidelines ("NCCN Guidelines"), certain chemotherapy regimens and/or immune checkpoint inhibitors may be used as a treatment for MSI-H/dMMR tumors after a prior cancer therapy. (*See* Schedule 3.0; EX1275, 21-24; EX1278, 26-29; EX1252, 44; EX1255, 57.) Immune checkpoint inhibitors recommended by the NCCN Guidelines for the treatment of MSI-H/dMMR tumors after a prior

cancer therapy include Keytruda (pembrolizumab), Opdivo (nivolumab), Yervoy (ipilimumab), Jemperli (dostarlimab), Libtayo (cemiplimab), Zynyz (retifanlimab), Tevimbra (tislelizumab), Loqtorzi (toripalimab), and Bavencio (avelumab). (*See* Schedule 3.0.)

20. Keytruda received FDA approval for the treatment of patients with advanced MSI-H/dMMR solid tumors that have progressed following prior treatment and who have no satisfactory alternative treatment options in May 2017. (EX1165; EX2004; EX1249; EX1261.) Keytruda, Opdivo, and Opdivo plus Yervoy received FDA approval for the treatment of patients with MSI-H/dMMR CRC that has progressed following prior treatment in May 2017, July 2017, and July 2018, respectively. (*See* Figure 1; EX1210; EX1165; EX1261-EX1265.) In August 2021, Jemperli received FDA accelerated approval for adult patients with dMMR recurrent or advanced solid tumors that have progressed following prior treatment and have no alternative treatment options. (EX1273.)

B. The Challenged Patent

21. The ’974 Patent, titled *Checkpoint blockade and microsatellite instability*, was filed on December 22, 2020, and issued on May 10, 2022. (EX1001.) I understand that the alleged priority date of the

’974 Patent is July 10, 2015. (EX1002.) I understand that the 974 Patent claims methods of treating microsatellite instability high cancer after a prior cancer therapy. (EX1001.) Claim 1 of the 974 Patent is shown below.

> A method for treating cancer in a patient in need thereof,
>
> wherein a tumor sample obtained from the patient has been determined to exhibit an instability of one or more microsatellite markers or a deficiency of one or more mismatch repair markers, the patient having received a prior cancer therapy drug to treat the tumor, the method comprising:
>
> administering an effective amount of pembrolizumab to the patient;
>
> wherein the patient exhibits an outcome that is improved as compared to a corresponding outcome that would be observed in a reference patient that has been administered pembrolizumab, wherein the reference patient has a tumor that does not exhibit an instability of the one or more microsatellite markers or a deficiency of the one or more mismatch repair markers.

(EX1001.)

22. I understand from Dr. Oberstein that the Keytruda antibody is not claimed by the ’974 Patent. In addition, Mr. Segers appears to rely generally on the independent claims of the ’974 Patent and does not tie his commercial success analysis to any dependent claims. (EX2191 ¶36.) Further, Mr. Segers relies on JHU declarant Dr. Richard Goldberg for his analysis, and, as I understand from Dr. Oberstein, Dr. Goldberg did not provide any purported analysis of

nexus for claims other than Claim 1. (EX2191 ¶¶7, 13, 36; EX1150, ¶¶113-114 (citing EX2090 ¶¶27-74).)

IV. COMMERCIAL SUCCESS AND NEXUS

23. I understand from counsel that the commercial success of a product can be used as an "objective indicia" in demonstrating the nonobviousness of the underlying patented invention. I also understand that in the law the concept of commercial success "presumes an idea would successfully have been brought to market sooner, in response to market forces, had the idea been obvious to persons skilled in the art" and that "the law deems evidence of (1) commercial success, and (2) some causal relation or 'nexus' between an invention and commercial success of a product embodying that invention, probative of whether an invention was nonobvious." *Merck & Co., Inc. v. Teva Pharms. USA*, 395 F.3d 1364, 1376 (Fed. Cir. 2005).

24. I understand that the Federal Circuit has explained the nexus requirement as follows:

> To establish a proper nexus between a claimed invention and the commercial success of a product, a patent owner must offer proof that the sales were a direct result of the unique characteristics of the claimed invention—as

> opposed to other economic and commercial factors unrelated to the quality of the patented subject matter. If a product both embodies the claimed features and is coextensive with the claims at issue, a nexus is presumed. In other words, a nexus exists if the commercial success of a product is limited to the features of the claimed invention. But if the commercial success is due to an unclaimed feature of the device or if the feature that creates the commercial success was known in the prior art, the success is not pertinent.

Sightsound Techs., LLC v. Apple Inc., 809 F.3d 1307, 1319 (Fed. Cir. 2015) (internal citations and quotations omitted).

25. I also understand that evidence of secondary considerations, including the commercial success of a product, may not support or indicate nonobviousness of a patent where market entry by others was impeded for some reason, such as the existence of a "blocking patent" (i.e., an earlier U.S. patent that is in place before the claimed invention, which prevents practice of the claimed invention). *Merck & Co., Inc. v. Teva Pharms. USA*, 395 F.3d at 1376; *Acorda Therapeutics, Inc. v. Roxane Labs., Inc.*, 903 F.3d 1310, 1337-39 (Fed. Cir. 2018).

26. In the following sections of this report, I analyze the commercial performance of Keytruda's use as a treatment for MSI-H/dMMR cancers after a prior cancer therapy and assess whether a nexus has

been shown to exist between the methods claimed in the ’974 Patent and the commercial performance of Keytruda’s use as a treatment for MSI-H/dMMR cancers after a prior cancer therapy.

A. Lack of Nexus Between Commercial Performance of Keytruda as an MSI-H/dMMR Treatment After a Prior Cancer Therapy and the ’974 Patent

27. I understand that JHU bears the burden of proving there is a nexus between its proffered evidence of commercial success and any alleged novel features of the ’974 Patent claims, and that if it fails to do so, such evidence must be discounted when determining obviousness. *Novartis AG v. Torrent Pharms. Ltd.*, 853 F.3d 1316, 1330-31 (Fed. Cir. 2017).

28. Mr. Segers offers no independent analysis of the nexus issue, instead Mr. Segers relies entirely on a conversation with JHU’s declarant, Dr. Richard Goldberg and on Dr. Goldberg’s declaration for the proposition that there is a nexus between the commercial success of Keytruda’s use as a treatment of MSI-H/dMMR cancers after a prior cancer therapy and the ’974 Patent claims. (EX2191, ¶¶7, 36.) As stated above, I understand that when a product embodies the claimed features of a patent and is coextensive with the claims at issue, a nexus is presumed. However, in this matter I understand that a presumption of nexus does not exist with respect to the ’974 Patent. (EX1150, ¶¶113-114.)

29. I understand from Dr. Oberstein that, with the exception of MSI-H/dMMR CRC, Keytruda's approved tumor-specific indications are not dependent on MSI-H/dMMR status. (Schedule 7.0.) I also understand from Dr. Oberstein that Keytruda is a potentially effective treatment for all tumor types that it is approved for, regardless of whether the tumor is MSI-H/dMMR status, except for the specific indication for MSI-H CRC tumors. (Schedule 7.0.) Furthermore, I understand from Dr. Oberstein that neither JHU nor its expert Dr. Goldberg have identified data showing that Keytruda treatment necessarily leads to an improved outcome in patients with MSI-H tumors compared to a corresponding outcome that would be observed in a reference patient treated with Keytruda that has a non-MSI-H/dMMR tumor, except for the specific indication for MSI-H/dMMR CRC tumors. Therefore, I understand that there is no basis for Mr. Segers' assumption that all use of Keytruda to treat MSI-H/dMMR tumors after a prior cancer therapy practices the '974 Patent and no basis to assume a nexus between use of Keytruda to treat MSI-H/dMMR tumors after a prior cancer therapy and the '974 Patent. As such, Mr. Seger's analysis fails to account for the fact that many patients with MSI-H/dMMR tumors may have been treated with

Keytruda regardless of MSI-H/dMMR status due to Keytruda's numerous tumor-specific approvals that are not dependent on MSI-H/dMMR status.

30. I understand that the nexus alleged in Mr. Segers' declaration is unsupported, and, as discussed below, it is further undermined by Mr. Segers' failure to address several confounding factors impacting the commercial performance of Keytruda as a treatment for MSI-H/dMMR cancers after a prior cancer therapy.

1. Merck Patents and Clinical Development Activities Created Economic Disincentives for Others to Develop the '974 Patent

31. I understand that an earlier U.S. patent that is in place before a claimed invention, which prevents practice of that later claimed invention (sometimes referred to as a "blocking patent") may offer an alternative explanation for why others in the market did not develop a product or technology sooner, even if it were obvious—i.e., because others were economically disincentivized or "blocked" from doing so by potential enforcement of the blocking patent. *Acorda Therapeutics, Inc. v. Roxane Labs*, Inc., 903 F.3d 1310, 1337-39 (Fed. Cir. 2018).

32. According to Merck's website, at least the following U.S. patents associated with Keytruda were filed and/or issued before the July 10, 2015 alleged priority date of the '974 Patent:

Figure 3: Merck Patents Associated with Keytruda

U.S. Patent No.	Filing Date	Date of Patent
8,354,509	June 13, 2008	January 15, 2013
8,900,587	December 19, 2012	December 2, 2014
9,220,776	September 30, 2013	December 29, 2015
9,834,605	December 19, 2014	December 5, 2017

(EX1213-1215, EX1217, EX1238.)

33. I understand that Merck's patents listed in the above table relate to the Keytruda compound and its use broadly in the treatment of cancer. (EX1213-1215, EX1217, EX1238; EX1150, ¶123.)

34. As of July 10, 2015, the alleged priority date of the '974 Patent, others would have been aware that pembrolizumab is Merck's drug and Merck owned rights to pembrolizumab, given the facts that Merck launched Keytruda in September 2014 and at least one of the Merck U.S. patents associated with Keytruda listed above had issued over a year earlier in January 2013. Others would also have been aware that Merck was pursuing related continuation or divisional applications,

one of which issued in December 2014, more than seven months before the alleged priority date.

35. Furthermore, as of July 10, 2015, others would have been aware that Merck was conducting multiple clinical trials to expand the approved indications for Keytruda. For example, on October 27, 2014 during Merck's Q3 2014 earnings call, the executive vice president of Merck Research Laboratories stated that "our development program for Keytruda has expanded to include more than two dozen studies around the world involving more than 6,000 patients and addressing more than 30 different tumor types." (EX1218, 8.) Merck's 10-Q filing for the quarterly period ended September 30, 2014 stated that "[t]he pembrolizumab clinical development program also includes studies across a broad range of cancer types including: bladder, colorectal, gastric, head and neck, melanoma, non-small cell lung, renal, triple negative breast and hematological malignancies." (EX1219, 46.)

36. Importantly, as of July 2015, others would also have been aware that Merck was a collaborator in the clinical study on which the '974 Patent is purportedly based. By June 12, 2013, the clinical study

record published on ClinicalTrials.gov, describing, among other things, using Keytruda to treat patients with MSI-H cancer, and identifying Merck as a collaborator on the study. (EX1005.)

37. Moreover, the ability to use Merck's drug in the clinical study to treat cancer patients was a direct result of the Parties' collaboration subject to a contractual agreement. (EX2131 ("Institution understands and acknowledges that the Study Drug which is being provided to Institution for the purpose of conducting the Study is the property of Merck and/or that it may be subject to certain intellectual property rights owned by or licensed to Merck.").)

38. Thus, as of the alleged priority date of the '974 Patent in July 2015, others were prevented and economically disincentivized from developing Keytruda in accordance with the methods of the challenged claims of the '974 Patent, since others would be at risk of infringing Merck's key patents covering Keytruda until 2028 and competitors would be aware that Merck was actively seeking FDA approvals for Keytruda in new indications including MSI-H/dMMR cancers.

39. Mr. Segers' failure to consider any of the above economic disincentives undermines his conclusion that "Keytruda's commercial success in treating MSI-H or dMMR cancer is due to the claimed invention." (EX2191, ¶10.)

2. Mr. Segers Fails to Account for Other Factors that May Have Contributed to Commercial Success

40. The calculations and conclusions described in Mr. Segers' declaration are flawed and unreliable for the reasons described in this declaration. However, even if these calculations were accurate—which they are not—Mr. Segers makes no attempt to consider other factors that may have led to the commercial performance of Keytruda used for treatment of MSI-H/dMMR cancers after a prior cancer therapy.

41. First, in June 2020 Keytruda received approval for the treatment of patients with unresectable or metastatic tumor mutational burden-high (TMB-H) solid tumors, as determined by an FDA-approved test, that have progressed following prior treatment and who have no satisfactory alternative treatment options. (EX1268.) I understand that this treatment approval, like Keytruda's approval as a treatment for patients with MSI-H/dMMR tumors that have progressed following prior treatment, is tissue/site agnostic. (EX1268.) Mr. Segers'

analyses fail to distinguish between usage of Keytruda attributable to the treatment of patients with MSI-H/dMMR tumors and usage attributable to the treatment of patients with TMB-H tumors.

42. Second, according to an IQVIA 2023 white paper titled "Success Multiplied: Launch Excellence for Multi-Indication Assets," multi-indication products such as Keytruda can benefit from "creating a 'halo effect' in the marketplace across indications to drive incremental brand awareness spanning different [health care provider] specialties and other stakeholders, thereby giving the asset a competitive edge." (EX1220, 2.) This is a particularly relevant issue for Keytruda, which has obtained more than 50 approvals, and received the Prix Galien USA Award for Best Biotechnology Product in 2015, which is "considered the highest accolade for pharmaceutical research and development." (*See* Figure 2; EX1221.) Mr. Segers fails to consider how Keytruda's numerous other approvals contributed to its performance in the MSI-H/dMMR cancer treatment marketplace, despite Mr. Segers' testimony conceding that brand recognition could be a factor that would increase the likelihood of a physician prescribing Keytruda over another drug, such as Opdivo. (EX1137, 110:5-114:11.) Instead, Mr. Segers incorrectly assumes that

Keytruda's approval for the treatment of MSI-H/dMMR cancer led to Keytruda's success in other indications (e.g., Mr. Segers incorrectly claims that there was an inflection point in Keytruda sales that occurred at the end of Q1 2017). (EX2191, ¶26.)

43. Third, Mr. Segers fails to account for the synergies achieved by virtue of Keytruda's prior success for other indications. From launch, Keytruda's MSI-H/dMMR cancer indication benefitted from the pre-existing manufacturing infrastructure and distribution networks that Merck already had in place to support prior indications. Despite Mr. Segers' understanding that such synergies could have contributed to Merck's profit margins for the relevant years, this confounding factor went unaddressed in his declaration. (EX1137, 53:10-55:20.)

44. Mr. Segers' failure to consider any of the above factors further undermines his conclusion that "Keytruda's commercial success in treating MSI-H or dMMR cancer is due to the claimed invention." (EX2191, ¶10.)

3. Mr. Segers Does Not Establish Nexus Between Any Alleged Novel Features of the ’974 Patent Claims and Commercial Success

45. I understand that the validity of a patent is assessed on a claim-by-claim basis. Therefore, I understand that to potentially provide objective evidence regarding the validity of a patent claim, such evidence must correspond to any alleged novel limitations of the patent claim being evaluated. Mr. Segers fails to tie the commercial performance of Keytruda used for the treatment of MSI-H/dMMR cancer after a prior cancer therapy to any alleged novel limitations of the claims of the ’974 Patent.

46. Mr. Segers does not consider what was known in the prior art relative to any alleged novel limitations of the claims of the ’974 Patent. I understand that every limitation of every claim had been previously disclosed in the study record published on ClinicalTrials.gov on June 10, 2013 (the “MSI-H Study Record” (EX1005)), or in the MSI-H Study Record in combination with additional prior art references. (EX1003, §§VII.A-G; EX1150, §§VII.D-K.)

47. Additionally, I understand from Dr. Oberstein that the ’974 Patent has numerous dependent claims which relate to, among other things, specific measures of patient outcomes and specific microsatellite

markers for identifying MSI-H/dMMR status. (EX1001.) The Segers declaration attributes the alleged commercial success of Keytruda for the treatment of MSI-H/dMMR tumors after a prior cancer therapy to the ’974 patent claims, regardless of the type of patient outcomes measured or the microsatellite markers used. (EX1244, 24:13-25:12.) Thus, if the Board were to find that certain claims of the ’974 Patent were not novel, the analysis presented in Mr. Segers’ declaration would not be relevant because it does not tie the alleged commercial success to any of the claimed specific measures of patient outcomes and specific microsatellite markers for identifying MSI-H/dMMR status.

B. Commercial Performance of Keytruda’s Use as Treatment of MSI-H/dMMR Cancers After a Prior Cancer Therapy

48. Even if Mr. Segers had successfully proven the requisite nexus, his underlying conclusions regarding the commercial performance of Keytruda’s use as a treatment for MSI-H/dMMR cancers after a prior cancer therapy are based on an incomplete and flawed analysis.

49. In his declaration, Mr. Segers states that “Keytruda’s use in treating MSI-H or dMMR cancer (regardless of cancer type) is commercially successful because: its sales and profits have been substantial and

growing since launch [and] its share of sales within its relevant market has been growing since launch." (EX2191, ¶9.) In the following sections, I assess each of these categories of evidence that purportedly support Mr. Segers' conclusion.

1. Keytruda Sales Revenue for Treatment of MSI-H/dMMR Cancers After a Prior Cancer Therapy

50. Mr. Segers' estimate of sales of Keytruda used for treatment of MSI-H/dMMR cancers after a prior cancer therapy is unreliable. More specifically, Mr. Segers asserts that "Keytruda's sales for non-first-line treatment of MSI-H or dMMR cancers would have [redacted] from 2018 to 2023 if Keytruda had not been approved as a first-line treatment for MSI-H or dMMR CRC" based on a projection of a linear forecast "based on the linear trend of Keytruda for treatment of all MSI-H or dMMR cancers from Q2 2018 to Q1 2019." (EX2191, ¶28.) Mr. Segers' opinions regarding Keytruda's sales are based on unsupported assumptions and a flawed analysis, as described below.

51. First, instead of estimating Keytruda sales for treatment of MSI-H/dMMR cancers after a prior cancer therapy, Mr. Segers creates a linear projection to estimate what these sales would have been if

Keytruda had not been approved as a first-line treatment for MSI-H/dMMR CRC in June 2020. As explained by Mr. Segers, he "estimates what Keytruda's sales for non-first-line treatment of MSI-H or dMMR cancers ***would have been*** from Q2 2019 through the end of 2023 if Keytruda was not approved for first-line treatment of MSI-H or dMMR CRC." (emphasis added) (EX2191, ¶28.) His projection of Keytruda's sales for the treatment of MSI-H/dMMR cancers after a prior cancer therapy is "based on the linear trend of Keytruda for treatment of all MSI-H or dMMR cancers from Q2 2018 to Q1 2019." (EX2191, ¶28.) Mr. Segers concludes that "Keytruda's sales for non-first-line treatment of MSI-H or dMMR cancers [redacted] from 2018 to 2023 if Keytruda ***had not been*** approved as a first-line treatment for MSI-H or dMMR CRC." (emphasis added) (EX2191, ¶28.) Mr. Segers' speculation about what Keytruda sales for the treatment of MSI-H/dMMR cancers after a prior cancer therapy would have been but-for its approval as a first-line treatment for MSI-H/dMMR CRC is neither supported nor relevant to the assessment of commercial success.

52. Second, Mr. Segers' hypothetical analysis appears to be founded on the assumption that there would be no sales of Keytruda for first-line

treatment of MSI-H or dMMR CRC absent approval, which is not the case. While Mr. Segers testified that he believes "off-label use is not very common," and that he is "unaware of any data that would show there's significant off-label use for Keytruda," (EX1244, 39:10-11, 39:17-19), sales for off-label first-line treatment of MSI-H or dMMR CRC likely occurred prior to the June 2020 approval and would have occurred in Mr. Segers' hypothetical scenario as well. (EX1243, 32:13-19, 33:14-34:6; *see also* EX1206, EX 1207.) Mr. Segers acknowledged as much, testifying that "some of the [redacted]" in "sales for non-first-line treatment of MSI-H or dMMR cancer indications" that he projected through the end of 2023 "would include first-line treatment." (EX2191, ¶28; EX1244, 63:2-5.)

53. Third, to the extent Mr. Segers is claiming that Keytruda's actual sales for the treatment of MSI-H/dMMR cancers after a prior cancer therapy increased linearly after Keytruda was approved as a first-line treatment for MSI-H/dMMR CRC, this claim is unreliable and unsupported. Mr. Segers does not rely on any documentary evidence or technical input as a basis to support his assumption that Keytruda's sales for the treatment of MSI-H/dMMR cancers after a prior cancer therapy grew linearly from Q2 2019 through Q4 2023. This

assumption fails to account for the possibility that sales of Keytruda for first-line treatment of MSI-H/dMMR CRC cannibalized sales of Keytruda for the treatment of MSI-H/dMMR CRC after a prior cancer therapy. In fact, I understand from Dr. Oberstein that Keytruda is more commonly used as a first-line treatment of MSI-H/dMMR CRC as opposed to a treatment after prior cancer therapy and that the population of MSI-H/dMMR CRC patients eligible to receive Keytruda as a treatment after a prior cancer therapy would decline as more patients began receiving it as a first-line treatment. (EX1150, ¶122.)

54. Fourth, Mr. Segers' estimate of Keytruda's sales for the treatment of MSI-H/dMMR cancers after a prior cancer therapy is inconsistent with his own estimates of sales of Keytruda for the treatment of MSI-H/dMMR tumors and sales of Keytruda for the treatment of MSI-H/dMMR CRC. Mr. Segers estimates that, from 2017 through 2023, total Keytruda sales for treatment of MSI-H/dMMR cancers was approximately [redacted] and when excluding first-line treatment of MSI-H/dMMR cancers, approximately [redacted]. (EX2191, ¶28; EX1269, ¶28.) Thus, Mr. Segers analysis implies that Keytruda's

sales for first-line treatment of MSI-H/dMMR cancers indications have totaled approximately [redacted], as shown below.[3]

[redacted]

55. Given that MSI-H/dMMR CRC is the only tumor type for which Keytruda is approved as a first-line treatment for an MSI-H/dMMR cancer, Mr. Segers' implied estimate of Keytruda sales for first-line treatment of MSI-H/dMMR cancer should be approximately equal to Keytruda's sales for first-line treatment of MSI-H/dMMR CRC.

[3] [redacted].

(Schedule 4.0; Schedule 5.0; EX2191, app. 5; EX1269, app.6; EX1270, app. 5.) However, the estimate of first-line MSI-H/dMMR sales is [redacted] the estimated sales of Keytruda for first-line treatment of MSI-H/dMMR CRC, based on Mr. Segers' own linear forecasting methodology.

56. To estimate Keytruda sales for first-line treatment of MSI-H/dMMR CRC, I forecasted sales for the treatment of MSI-H/dMMR CRC after a prior cancer therapy using Mr. Segers' linear forecasting methodology and then deducted these sales from Mr. Segers' estimate of total MSI-H/dMMR CRC sales, as reflected in the following figure.

57. As shown above, Mr. Segers' linear forecasting methodology indicates that, from 2017 through 2023, Keytruda's sales for the first-line treatment of MSI-H/dMMR CRC totaled approximately ,[4] which is larger than Mr. Segers' implied estimate of first-line MSI-H/dMMR sales.[5] (*See* Schedule 4.0; Schedule 5.0; EX2191, app. 5; EX1269, app. 6; EX1270, app. 5.) This discrepancy

[4]

[5] .

demonstrates that Mr. Segers' linear forecasting methodology is unreliable and that his sales estimates are unsupported.

58. Fifth, even if one were to accept Mr. Segers' estimate of Keytruda sales for the treatment of MSI-H/dMMR cancers after a prior cancer therapy, his claim that "Keytruda's sales for MSI-H or dMMR cancers have been strong compared to competitor products in the market" is based on an incomplete analysis and arbitrary assumptions about competing product sales. (EX2191, ¶30.) The only competing products that Mr. Segers considers in the marketplace for the treatment of MSI-H/dMMR cancers after a prior cancer therapy are Opdivo, Yervoy, and Jemperli. (EX2191, ¶30.) Additional treatments that Mr. Segers ignores include at least standard chemotherapies and other treatments recommended by the NCCN guidelines for the treatment of MSI-H/dMMR cancers, such as Libtayo (cemiplimab), Zynyz (retifanlimab), Tevimbra (tislelizumab), Loqtorzi (toripalimab), and Bavencio (avelumab). (*See* Schedule 3.0.)

59. Moreover, in his calculation of estimated annual U.S. sales of Keytruda, Opdivo, Yervoy, and Jemperli for the treatment of MSI-H/dMMR cancers, Mr. Segers' estimates of Opdivo and Yervoy sales

for the treatment of MSI-H/dMMR cancer are wholly unsupported. Mr. Segers incorrectly claims that "[a]ccording to Bristol-Myers Squibb, MSI-H or dMMR cancer indications accounted for no more than—and likely less than—5 percent of OPDIVO and YERVOY U.S. sales in 2018 and 2019." (EX2191, ¶30.) He then assumes that MSI-H/dMMR accounted for no more than 5% of Opdivo and Yervoy U.S. sales for the entire 2018-2023 time period. (EX2191, app. 7.) To support this assumption, Mr. Segers cites to BMS earnings call transcripts from Q2 and Q3 2018 and Q1 2019, which provide the following breakdown of U.S. sales of Opdivo and Yervoy by indication.

Figure 6: Sales of Opdivo and Yervoy by Indication in the U.S. According to BMS Earnings Call Transcripts (Q2-Q3 2018 and Q1 2019)[6]

Indication	Q2 2018	Q3 2018	Q1 2019
Lung	35%	35%	25%
Melanoma	35%	30%	30%
Renal	20%	20%	20%
Head and Neck	5%	N/A	N/A
Other Indications	**5%**	**15%**	**20%**
Total	100%	100%	95%

(EX2213, 10; EX2214, 12; EX2215, 10.)

60. Mr. Segers provides no support for his assumption that this percentage remained the same over the subsequent five-year period of 2019-2023. Furthermore, although Mr. Segers cites the Q3 2018 and Q1 2019 Earnings Calls as "mentioning similar percentages for lung, melanoma, and renal and not mentioning MSI-H or colorectal cancer," he provides no explanation for why he ignores the substantial increase in sales attributed to other indications that occurred between

[6] The estimates provided in Bristol-Myers Squibb Company, Q1 2019 Earnings Call, dated April 25, 2019 (EX2215) sum to only 95% of total U.S. sales.

Q2 2018 and Q1 2019, as shown in the figure above and acknowledged in Mr. Segers' testimony. (EX2191, ¶30 n.33; EX1244, 88:15-89:14.) If Mr. Segers' analysis had accounted for the percentages provided in the Q3 2018 and Q1 2019 Earnings Calls, the estimated sales of Opdivo and Yervoy for the treatment of MSI-H/dMMR cancer would have quadrupled by Q1 2019 (from 5% Q3 2018 to 20% in Q1 2019).[7]

61. Sixth, Mr. Segers' claim that "[s]ales of Keytruda for treatment of MSI-H or dMMR cancers were higher than sales of 17 of Merck's 31 pharmaceutical products" is neither supported nor relevant to the

[7] The Segers Declaration assumes the other indications category in the BMS Earnings Call transcripts reflects the upper bound of MSI-H/dMMR sales as a percentage of total sales (EX1137, 151:8-152:13.) The other indications category grew four-fold, from 5% in Q2 2018 to 20% in Q1 2019 (*See* Figure 8.) Thus, had Mr. Segers accounted for the percentages from the Q1 2019 Earnings Call, the estimated MSI-H/dMMR sales would be calculated by multiplying total Opdivo and Yervoy U.S. sales for the 2019-2023 period by 20%, resulting in a four-fold increase in the estimated sales of Opdivo and Yervoy over that period.

commercial success assessment. (EX2191, ¶29.) In addition to using an unreliable estimate of Keytruda sales for the treatment of MSI-H/dMMR cancers, Mr. Segers' comparison of sales of Merck products is limited solely to sales occurring in 2018. (EX2191, ¶29.) Mr. Segers fails to explain why a comparison of sales in 2018 would be a reasonable proxy for sales of these products in other years or why such a comparison is relevant at all. In fact, Mr. Segers testified that a comparison for other years, if different than 2018, could be relevant to his analysis. (EX1244, 93:3-20.) Mr. Segers' 2018 sales comparison includes all Merck pharmaceutical products, regardless of the market in which these products are sold. Mr. Segers admittedly fails to consider the differences between the market for MSI-H/dMMR cancer treatments and the markets in which Merck's other products are sold and, importantly, fails to provide any evidence as to whether any of Merck's other products have achieved commercial success in their respective markets. (EX1244, 94:10-95:13.) As a result, Mr. Segers' 2018 sales analysis is wholly unreliable and uninformative to the determination of whether Keytruda used as an MSI-H/dMMR cancer treatment has achieved commercial success.

62. Seventh, Mr. Segers incorrectly claims that "the timing of Keytruda's FDA approval for the treatment of adult and pediatric patients with unresectable or metastatic MSI-H or dMMR solid tumors coincides with an apparent inflection point in Keytruda's sales trajectory." (EX2191, ¶26.) As purported evidence of an inflection point occurring in May 2017, Mr. Segers states:

> Keytruda earned [redacted] more in net sales in the four quarters following FDA approval for the treatment of adult and pediatric patients with unresectable or metastatic MSI-H or dMMR solid tumors (2017 Q2 through 2018 Q1) than it had in the four quarters prior, for a growth of [redacted]. By comparison, Keytruda sales grew by only [redacted] in the four quarters prior to FDA approval for the treatment of adult and pediatric patients with unresectable or metastatic MSI-H or dMMR solid tumors (2016 Q2 though 2017 Q1), a growth rate of [redacted]. This increase in the rate of growth several years after launch is notable, as typically growth rates are highest in the years immediately following launch.

(EX2191, ¶26.)

63. However, the quarterly growth rate in [redacted], indicating that the inflection point in Keytruda sales began in Q4 2016 rather than Q2 2017. (Schedule 6.1.) Further, as shown below, the growth rate of the Q2 2017 – Q1 2018 period was 51 percentage points higher than the growth rate of the prior four quarters

while the growth rate of the Q4 2016 – Q3 2017 period was [redacted] than the growth rate of the prior four quarters.

[redacted]

64. These data demonstrate that the inflection point in Keytruda's sales trajectory began Q4 2016, prior to the Q2 2017 Keytruda approval as a treatment for MSI-H/dMMR solid tumors.

65. The Q4 2016 inflection point in Keytruda's sales trajectory coincides with Keytruda's October 24, 2016 approval which provided "an expansion of the metastatic NSCLC indication to include first-line treatment of patients whose tumors have high PD-L1 expression (TPS ≥ 50%) as determined by an FDA approved test, with no EGFR or ALK genomic tumor aberrations." (EX1199.) Prior to this approval,

[8] [redacted]

Keytruda's use in the NSCLC indication was limited to "the treatment of patients with metastatic, PD-L1 positive, non-small cell lung cancer (NSCLC), as determined by an FDA-approved test, with disease progression on or after platinum-containing chemotherapy." (EX1171.)

66. The expansion of the metastatic NSCLC indication has been recognized as being key to Keytruda's success. The previously discussed IQVIA 2023 white paper describes the significance of this approval to Keytruda's launch strategy which focused first on narrow indications before obtaining subsequent approvals in broader indications (referred to as a "narrow first" launch strategy). (EX1220, 4.)

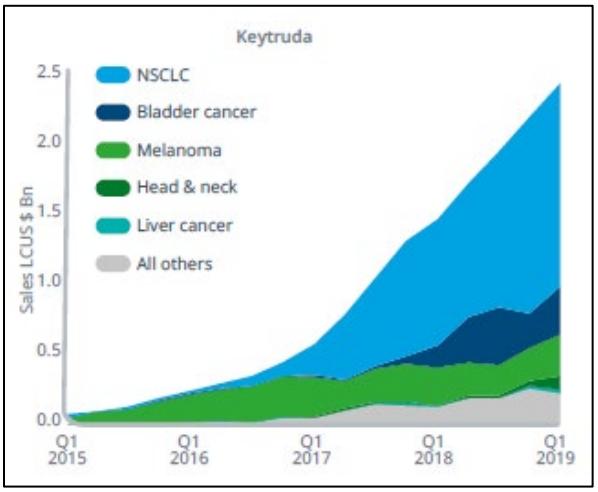
> Keytruda is a case in point for a tremendously successful 'narrow first' strategy, in which the PD-L1 biomarker played a crucial role. When launching Keytruda, Merck chose a highly targeted approach, focusing on second-line NSCLC patients with high PD-L1 expression who should see the greatest benefit. Conversely, Opdivo launched with a broad strategy, targeting all second-line NSCLC patients regardless of PD-L1 expression.
>
> By demonstrating superior outcomes in its narrow initial population, Keytruda secured subsequent approval for first-line NSCLC patients with tumours expressing high levels of PD-L1, opening up the larger first-line market opportunity. At the same time, the FDA expanded use of Keytruda to all second-line NSCLC patients regardless of

> level of PD-L1 expression. Thus 'narrow-first', followed by strategic indication expansion, provided the path towards broad use of Keytruda and, ultimately, its dominant market position [].
>
> Today, most multi-indication oncology products pursue a narrow-first indication sequencing strategy, a reflection of the growing number of approvals based on less mature data, an increasingly crowded and competitive oncology landscape which payers use to their advantage, and the reality of significant differences in products' relative value in different indications.

(EX1220, 4.)

67. By the time Keytruda received approval for the treatment of MSI-H/dMMR solid tumors in Q2 2017, lung cancer accounted for approximately 50% of all US sales of Keytruda. (EX2231, 6.) The IQVIA whitepaper also included the following graph illustrating the significance of the NSCLC indication to Keytruda's global sales.

Figure 8: Keytruda Sales by Indication (Q1 2015 – Q1 2019)



(EX1220, 3-4.)

68. I also note that numerous public sources indicate that Keytruda has the leading share of the NSCLC market. (EX1222, 4; EX1223-1225.)

69. Mr. Segers also states that the "increase in the rate of growth several years after launch is notable, as typically growth rates are highest in the years immediately following launch." (EX2191, ¶26.) This statement fails to recognize that an increasing growth rate several years after launch is the expected outcome of a multi-indication product pursuing a "narrow first" strategy because the product's initial approved indications are intended to be smaller in size than later approved indications.

70. Eighth, Mr. Segers' estimate of the profits that Merck allegedly earned on sales of Keytruda for the treatment of MSI-H/dMMR after a prior cancer therapy is unsupported. (EX2191, ¶32.) These estimates are based on the assumption that Merck's profit margin percentage on these sales are equal to the operating profit percentage for the company as a whole. (EX2191, ¶32.) Mr. Segers fails to provide any support, and I am unaware of any support, for this assumption.

71. Mr. Segers' estimate of Keytruda sales for the treatment of MSI-H/dMMR cancer after a prior cancer therapy is unsupported for the reasons discussed above. Additionally, there is no basis for Mr. Segers' claim that Keytruda's sales for the treatment of MSI-H/dMMR after a prior cancer therapy have been strong compared to competitor products in the market given that: 1) he excluded a number of treatments of MSI-H/dMMR after a prior cancer therapy in his analysis, and 2) his estimates of Opdivo and Yervoy MSI-H/dMMR sales are wholly unsupported. Furthermore, the approval of Keytruda for the treatment of MSI-H/dMMR solid tumors did not cause an inflection point in Keytruda's sales trajectory as suggested by Mr. Segers.

2. Keytruda Market Share for Treatment of MSI-H/dMMR Cancers After a Prior Cancer Therapy

72. Mr. Segers claims that Keytruda's share of the market for treatment of MSI-H/dMMR cancers after a prior cancer therapy ranged from [redacted] to [redacted] from 2017 through 2023, and that "[t]his gain in market share and eventually dominant market share compared to its competitors is evidence of the commercial success of Keytruda's use as a treatment for MSI-H or dMMR cancers." (EX2191, ¶34, app. 8.) As explained

below, these market share estimates are based on an incomplete and unreliable analysis and, therefore, any conclusions based on these estimates are equally unreliable.

73. Mr. Segers incorrectly assumes that "the total market for drugs specifically targeted to treat MSI-H or dMMR cancers is defined by the sales of Keytruda, Opdivo, Yervoy, and Jemperli." (EX2191, ¶34.) Mr. Segers ignores other immunotherapy products which, according to NCCN recommendations, may be used to treat MSI-H/dMMR cancers such as Libtayo (cemiplimab), Zynyz (retifanlimab), Tevimbra (tislelizumab), Loqtorzi (toripalimab), and Bavencio (avelumab). (Schedule 3.0.) Mr. Segers also ignores standard chemotherapies which may be used to treat MSI-H/dMMR cancers according to NCCN guidelines. (EX1275, 21-24; EX1278, 26-29; EX1252, 44; EX1255, 57.) Given the exclusion of these products, Mr. Segers' market share analysis is incomplete and overstates Keytruda's share of the market for treatments of MSI-H/dMMR cancers after a prior cancer therapy.

74. Moreover, even if the marketplace for treatments of MSI-H/dMMR cancers after a prior cancer therapy was comprised only of Keytruda,

Opdivo, Yervoy, and Jemperli —which it is not—Mr. Segers' estimates of Opdivo and Yervoy sales are based on arbitrary assumptions. As previously explained, Mr. Segers assumes that MSI-H/dMMR accounted for no more than 5% of Opdivo and Yervoy U.S. sales from 2018 through 2023 based solely on the 5% of sales attributed to "other" indications in BMS's Q2 2018 Earnings Call transcript. Despite citing to the BMS Q3 2018 and Q1 2019 Earnings Call transcripts, Mr. Segers ignores the fact that those documents state that the percentage of Opdivo and Yervoy sales attributed to other indications increased to 15% in Q3 2018 and to 20% in Q1 2019. (EX2213, 10; EX2214, 12; EX2215, 10.) Because Mr. Segers' estimate of Opdivo and Yervoy MSI-H/dMMR sales and market share are based on unsupported and arbitrary assumptions, his calculation of Keytruda's market share is also unsupported and arbitrary.

75. For the reasons described above, Mr. Segers' market share analysis is incomplete and unreliable and, as such, his conclusions regarding Keytruda's market share are also unreliable.

V. CONCLUSION

76. Based on the analyses described throughout this declaration, it is my opinion that there is no evidence of a nexus between the challenged claims of the ’974 Patent and the commercial performance of Keytruda’s use as a treatment for MSI-H/dMMR cancers after a prior cancer therapy. Additionally, as explained above, Mr. Segers’ declaration presents a flawed and misleading analysis which does not establish any secondary considerations of the ’974 Patent claims.

77. I declare that all statements made herein to my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Respectfully submitted:

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May 1, 2025

Tab 1

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Dr. Sheridan has served as an expert witness in cases brought before federal and state courts, the Patent Trial and Appeal Board, the International Trade Commission (ITC), and domestic and international arbitration tribunals. He has developed numerous damages analyses related to patent infringement, breach of contract, and trade secret misappropriation, including analyses quantifying lost profits, reasonable royalties, and unjust enrichment. He has also analyzed the issues of commercial success, irreparable harm, and the economic prong of the domestic industry requirement in ITC Section 337 proceedings. Outside of litigation, Dr. Sheridan has provided financial consulting services for purposes such as transaction due diligence, license negotiations, and strategic decision-making. The engagements he has worked on span a wide range of industries and products, including pharmaceuticals, biologics, medical devices, diagnostics, research tools, electronic health records, telecommunications, mobile devices, oil and gas, automotive technologies, robotics, computer software and hardware, insurance, and financial products, among others.

Previously, Dr. Sheridan was as an assistant director at the technology transfer office at the University of Chicago where he was responsible for managing the intellectual property strategy for a broad range of technologies and was frequently required to assess the value of new discoveries and potential products. In that role he personally negotiated a variety of contracts including licenses, option agreements, and collaboration agreements with companies ranging from Fortune 500 firms to small start-ups.

Dr. Sheridan is a frequent speaker and instructor on intellectual property valuation and publishes on related topics. He was named to the *IAM Patent 1000: The World's Leading Patent Professionals* (economic experts) every year since 2019.

Selected affiliations

- Licensing Executives Society, Life Sciences Royalty Rates and Deal Terms Survey, committee member (2016–present)
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Publications and presentations

- "Valuation as a Tool for Early-Stage Tech Transfer Agreements" Department of Energy, Technology Transfer Working Group, Webcast, 2024.
- "Negotiating Successful Biopharma Partnerships" LES Annual Meeting, Chicago, IL, 2023, Moderator.
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- "IP Valuation Basics" LES Course, Webcast, 2020, Co-instructor.
- "Early Stage Intellectual Property Valuation" LES Course, Webcast, 2020, Co-instructor.
- "Mini-Roundtable: Patent Disputes," *Corporate Disputes Magazine*, April-June 2020 Issue, Co-author.
- "BPCIA Patent Dance: Navigating the Biosimilar Litigation Landscape in 2020" Webcast, The Knowledge Group, 2020, Co-presenter.
- "Global Life Sciences Royalty Rate and Deal Terms Survey 2018" LES Annual Meeting, Phoenix, AZ, 2019, Co-presenter.
- "Business Development for Life Sciences" LES Annual Meeting, Phoenix, AZ, 2019, Co-instructor.
- "Apportionment and the Entire Fair Market Value Rule (EMVR) in Patent Damages: Trends, Methods and Best Practices in 2019" Webcast, The Knowledge Group, 2019, Co-presenter.
- "Deal Terms - Do You Really Know What's Happening in Your Therapeutic Areas?" LES Webinar, 2019, Co-presenter.
- "IP Valuation" LES University Course, Vancouver, BC, 2019, Co-instructor.
- "Managing Risks and Uncertainty in Licensing Early-Stage Therapies" *Bloomberg Law*, 2018, Co-author.
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- "Valuation and Negotiation" Polsky Center for Entrepreneurship and Innovation, Chicago, IL, 2017.
- "Business Development for Life Sciences" LES University Course, Chicago, IL, 2017, Co-presenter.
- "Global Life Sciences Royalty Rates and Deal Terms Survey, Implications and Applications" Webinar, 2017, Co-presenter.
- "LES U.S.A. and Canada & LESI Global Life Sciences Royalty Rate and Deal Terms Survey 2016" Webinar, 2017, Co-presenter.
- "Release of 5th Global Life Sciences Royalty Rate and Deal Terms Survey" LES 2016 Annual Meeting, Vancouver, BC, Canada, 2016, Co-presenter.
- "Valuing IP" Guest Lecture, University of Notre Dame, Notre Dame, IN, 2016.
- "Portfolio Analysis and Due Diligence for Monetization" IP Enforcement Summit, Chicago, IL, 2016, Co-presenter.
- "How Mayo, Myriad and Alice May Impact Patent Valuations" *Law360*, 2015.

- "Intellectual Property Valuation" Guest Lecture, University of Notre Dame, Notre Dame, IN, 2015.
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Expert witness experience

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  United States District Court for the District of Delaware
  Expert report and deposition testimony.

- Certain Liquid Coolers for Electronic Components in Computers, Components Thereof, Devices for Controlling Same, and Products Containing Same
  Cooler Master Co. Ltd. et al. v. SilverStone Technology Co., Ltd. et al.
  U.S. International Trade Commission
  Investigation No. 337-TA-1394.
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Tab 3

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Schedule 3.0

NCCN Recommended Immunotherapy Drugs for MSI-H/dMMR Treatment After a Prior Cancer Therapy by Cancer Type

		NCCN Recommended Immunotherapy Drugs for MSI-H/dMMR Treatment After a Prior Cancer Therapy								
Cancer (1)	**Source**	**Keytruda (pembrolizumab)**	**Opdivo (nivolumab)**	**Yervoy (ipilimumab)**	**Jemperli (dostarlimab)**	**Libtayo (cemiplimab)**	**Zynyz (retifanlimab)**	**Tevimbra (tislelizumab)**	**Loqtorzi (toripalimab)**	**Bavencio (avelumab)**
Biliary Tract	EX1253	X			X					
Breast	EX1254	X			X					
Endometrial	EX1250	X	X		X					X
Esophageal	EX1255	X	X	X	X					
Gastric	EX1252	X	X	X	X					
Hepatocellular	EX1259	X			X					
Ovarian	EX1277	X			X					
Pancreatic	EX1257	X			X					
Small Bowel (2)	EX1251	X	X	X	X	X	X	X	X	

Note(s):

(1) I have identified cancers for which the NCCN recommended immunotherapy drugs in addition to Keytruda (pembrolizumab) for MSI-H/dMMR treatment after a prior cancer therapy.

(2) For Small Bowel cancer, the indicated NCCN recommended immunotherapy drugs are for any line of therapy (EX1251).

Tab 4

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Schedule 4.0

Segers Implied Estimate of Keytruda's U.S. Sales for First-Line Treatment of MSI-H/dMMR Cancers (2017 - 2023)

[redacted]

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Schedule 4.1

Segers Estimate of U.S. Net Sales of MSI-H/dMMR Treatment After a Prior Cancer Therapy by Month (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 4.1

Segers Estimate of U.S. Net Sales of MSI-H/dMMR Treatment After a Prior Cancer Therapy by Month (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 4.1

Segers Estimate of U.S. Net Sales of MSI-H/dMMR Treatment After a Prior Cancer Therapy by Month (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 4.1

Segers Estimate of U.S. Net Sales of MSI-H/dMMR Treatment After a Prior Cancer Therapy by Month (Jan. 2017 - Dec. 2023)

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Schedule 4.2

Segers Estimate of U.S. MSI-H/dMMR Cancer Net Sales (2017 - 2023)

[redacted]

Tab 5

Merck Sharp & Dohme LLC v. The Johns Hopkins University

Schedule 5.0

Keytruda's Net Sales for First-Line U.S. MSI-H/dMMR CRC Based on Mr. Segers' Linear Forecasting Methodology (2017 - 2023)

[redacted]

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Schedule 5.1

Estimate of U.S. Net Sales of MSI-H/dMMR CRC Treatment After a Prior Cancer Therapy Based on Mr. Segers' Linear Forecasting Methodology (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 5.1

Estimate of U.S. Net Sales of MSI-H/dMMR CRC Treatment After a Prior Cancer Therapy Based on Mr. Segers' Linear Forecasting Methodology (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 5.1

Estimate of U.S. Net Sales of MSI-H/dMMR CRC Treatment After a Prior Cancer Therapy Based on Mr. Segers' Linear Forecasting Methodology (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 5.1

Estimate of U.S. Net Sales of MSI-H/dMMR CRC Treatment After a Prior Cancer Therapy Based on Mr. Segers' Linear Forecasting Methodology (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 5.1

Estimate of U.S. Net Sales of MSI-H/dMMR CRC Treatment After a Prior Cancer Therapy Based on Mr. Segers' Linear Forecasting Methodology (Jan. 2017 - Dec. 2023)

[redacted]

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Schedule 5.2

CRC Share of U.S. Keytruda Total Patients by Patient Type (Jan. 2017 - Jan. 2024) [(1)]

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Schedule 5.2

CRC Share of U.S. Keytruda Total Patients by Patient Type (Jan. 2017 - Jan. 2024) [(1)]

[redacted]

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Schedule 5.2

CRC Share of U.S. Keytruda Total Patients by Patient Type (Jan. 2017 - Jan. 2024) [(1)]

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Schedule 5.2

CRC Share of U.S. Keytruda Total Patients by Patient Type (Jan. 2017 - Jan. 2024) [(1)]

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Schedule 5.2

CRC Share of U.S. Keytruda Total Patients by Patient Type (Jan. 2017 - Jan. 2024) [(1)]

[redacted]

Tab 6

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Schedule 6.0

Total U.S. Keytruda Net Sales Growth Rate Delta (Q4 2016 v. Q2 2017 Inflection Point)

[redacted]

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Schedule 6.1

Total U.S. Keytruda Net Sales and Quarterly Growth Rates (2014 - 2018) [(1)]

[redacted]

Tab 7

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Schedule 7.0

Keytruda FDA Approvals by Indication (Sep. 2014 - Dec. 2024) (1)

Tumor Type	Total No. of Approvals	Approval Dates (1)	Source
Melanoma	4	9/4/2014	EX1169
		12/18/2015	EX1205
		2/15/2019	EX1178
		12/3/2021	EX1203
Non-small cell lung cancer (NSCLC)	8	10/2/2015	EX1171
		10/24/2016	EX1199
		5/10/2017	EX1162
		8/20/2018	EX1193
		10/30/2018	EX1200
		4/11/2019	EX1181
		1/26/2023	EX1177
		10/16/2023	EX1197
Head and neck squamous cell carcinoma (HNSCC)	3	8/5/2016	EX1168
		6/10/2019 (2)	EX1183
Classical hodgkin lymphoma (cHL)	3	3/14/2017	EX1159
		10/14/2020 (2)	EX1196

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Schedule 7.0

Keytruda FDA Approvals by Indication (Sep. 2014 - Dec. 2024) (1)

Tumor Type	Total No. of Approvals	Approval Dates (1)	Source
Bladder Cancer	6	5/18/2017	EX1163
		5/18/2017	EX1164
		1/8/2020	EX1175
		4/3/2023	EX1160
		12/15/2023 (2)	EX1204
MSI-H/dMMR Colorectal cancer (MSI-H/dMMR CRC)	2	5/23/2017	EX1165
		6/29/2020	EX1187
MSI-H/dMMR solid tumors (MSI-H/dMMR)	1	5/23/2017	EX1165
Gastric cancer	2	5/5/2021	EX1161
		11/16/2023	EX1201
Cervical cancer	4	6/12/2018	EX1184
		10/13/2021 (2)	EX1195
		1/12/2024	EX1176
Primary mediastinal large B cell lymphoma (PMBCL)	1	6/13/2018	EX1166
Hepatocellular carcinoma (HCC)	1	11/9/2018	EX1172
Merkel cell carcinoma (MCC)	1	12/19/2018	EX1174
Renal cell carcinoma (RCC)	3	4/19/2019	EX1182
		8/10/2021	EX1192
		11/17/2021	EX1202

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Schedule 7.0

Keytruda FDA Approvals by Indication (Sep. 2014 - Dec. 2024) (1)

Tumor Type	Total No. of Approvals	Approval Dates (1)	Source
Esophageal cancer	2	7/30/2019	EX1191
		3/22/2021	EX1180
Endometrial cancer	4	9/17/2019	EX1170
		7/21/2021	EX1189
		3/21/2022	EX1179
		6/17/2024	EX1185
Tumor mutational burden-high (TMB-H) solid tumors	1	6/16/2020	EX1167
Cutaneous squamous cell carcinoma (cSCC)	2	6/24/2020	EX1186
		7/1/2021	EX1188
Triple negative breast cancer (TNBC)	3	11/13/2020	EX1173
		07/26/2021 (2)	EX1190
Biliary cancer	1	10/31/2023	EX1198
Malignant pleural mesothelioma (MPM)	1	9/17/2024	EX1194

Note(s):

(1) Includes FDA Approval Letter dates for Keytruda Approvals/Expansions by indication. Excludes all approvals that were subsequently withdrawn by the FDA. If there were two or more indication approvals/expansions granted by a letter, the number of indications has been indicated in parentheses beside the letter date.