

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

GUARDANT HEALTH, INC.,

Plaintiff

v.

FOUNDATION MEDICINE, INC.,

Defendant.

C.A. No. 17-cv-1616-LPS-CJB

**JURY TRIAL DEMANDED**

**SECOND AMENDED COMPLAINT**

Plaintiff Guardant Health, Inc. (“Guardant”), for its second amended complaint against Defendant Foundation Medicine, Inc. (“Foundation”) on behalf of itself, by Guardant’s attorneys, hereby alleges as follows:

**NATURE OF THE ACTION**

1. This is an action for patent infringement arising under the patent laws of the United States, Title 35, United States Code, against Defendant Foundation.
2. Guardant brings this action to halt Foundations’ infringement of Guardant’s rights under the Patent Laws of the United States 35 U.S.C. § 1, et seq., which arise under U.S. Patent Nos. 9,598,731 (“the ’731 patent”) (attached as Exhibit 1), 9,834,822 (“the ’822 patent”) (attached as Exhibit 2), 9,840,743 (“the ’743 patent”) (attached as Exhibit 3), and 9,902,992 (“the ’992 patent”) (attached as Exhibit 4).

**PARTIES**

1. Guardant is a corporation organized and existing under the laws of the state of Delaware, having its principal place of business at 505 Penobscot Dr., Redwood City, CA 94063.

2. Guardant was founded in 2012 by pioneers in DNA sequencing and cancer diagnostics. Since its inception, Guardant has focused its expertise on the development of liquid biopsy cancer assays. It was the first company to develop and commercialize a comprehensive liquid biopsy assay to identify genomic biomarkers for advanced solid tumors using “cell-free circulating tumor DNA,” or “ctDNA,” from simple, non-invasive blood draws.

3. Today, Guardant markets and sells the Guardant360® ctDNA assay (“Guardant 360”). Guardant360 uses advanced DNA sequencing methods to identify targeted therapy treatment options based on the specific changes—also known as somatic mutations—that occur within the DNA of cancer cells. Guardant360 has helped thousands of oncologists find accurate and actionable information about tens of thousands of cancer patients, while avoiding the high costs and added risks of tissue biopsies.

4. On information and belief, Foundation Medicine, Inc. (“Foundation”) is a corporation organized and existing under the laws of the state of Delaware, having its principal place of business at 150 Second Street, Cambridge, MA 02141. Foundation markets and sells a liquid biopsy known as FoundationACT. On information and belief, Foundation performs FoundationACT at its facility in Cambridge, MA.

#### **JURISDICTION AND VENUE**

5. This action arises under the patent laws of the United States, 35 U.S.C. §§ 100, *et seq.*, and this Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331, 1338(a), 2201 and 2202.

6. Venue is proper in this Court under 28 U.S.C. §§ 1391 and 1400(b).

7. This Court has jurisdiction over Foundation because, upon information and belief, Foundation Medicine is a Delaware corporation.

8. This Court also has jurisdiction over Foundation because, upon information and belief, Foundation, directly or indirectly, uses, offers for sale, and/or sells the FoundationACT throughout the United States and in this judicial district.

9. Further, the Court has jurisdiction over Foundation because, inter alia, this action arises from actions of Foundation directed toward Delaware, and because Foundation has purposefully availed itself of the rights and benefits of Delaware law by engaging in systematic and continuous contacts with Delaware. Upon information and belief, Foundation regularly and continuously transacts business within Delaware, including by selling FoundationACT in Delaware, either on its own or through its affiliates. Upon information and belief, Foundation derives substantial revenue from the sale of FoundationACT in Delaware and has availed itself of the privilege of conducting business within Delaware.

10. For these reasons, and for other reasons that will be presented to the Court if jurisdiction is challenged, the Court has personal jurisdiction over Foundation.

### **BACKGROUND**

11. Guardant repeats and re-alleges the foregoing paragraphs as if set forth specifically herein.

12. On information and belief, in the mid-2016 time frame Foundation began commercializing FoundationACT. According to a Foundation press release, FoundationACT is “an analytically validated and accurate blood-based circulating tumor DNA (ctDNA) assay that provides patients and oncologists with a new option for comprehensive genomic profiling when a tissue biopsy is not feasible or when tissue is not available. By analyzing circulating tumor DNA isolated from a patient’s blood, FoundationACT can identify clinically relevant genomic alterations, and like Foundation Medicine’s tissue-based genomic profiles, FoundationOne® and

FoundationOne Heme®, FoundationACT delivers this comprehensive molecular information in a concise report that matches the findings with potentially relevant targeted therapies and clinical trials.” Exhibit 5.

13. In February 2017, scientists affiliated with Foundation presented the poster “Genomic profiling of circulating tumor DNA (ctDNA) from patients with advanced cancers of the GI tract and anus” (attached hereto as Exhibit 6) at the American Society of Clinical Oncology meeting. On information and belief, this poster describes the methodology that Foundation uses in its FoundationACT test, an overview of which is presented in the figure below:

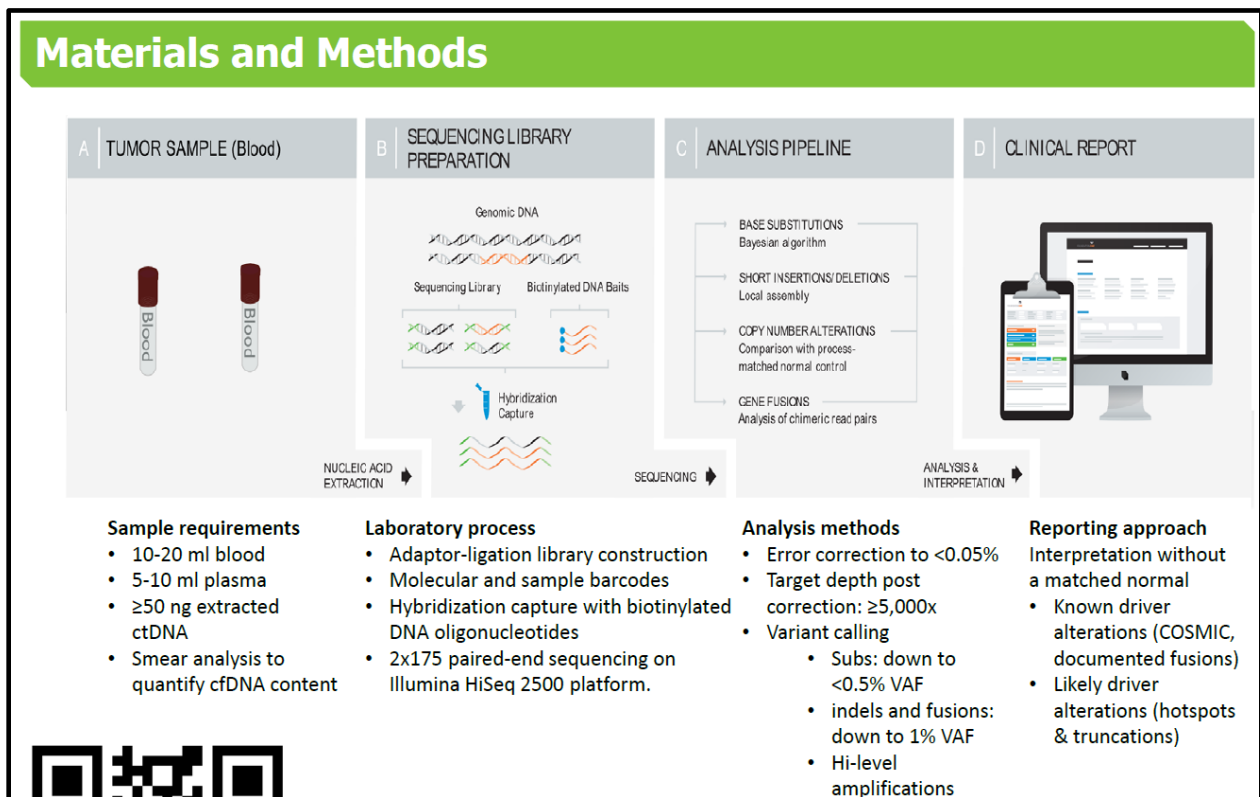


Exhibit 6.

14. Foundation infringes, literally or under the doctrine of equivalents, Guardant’s ’731 patent through its activities connected to its performance of the Foundation ACT test. For instance, representative claim 1 of the ’731 patent is listed below:

1. A method for quantifying single nucleotide variant tumor markers in cell-free DNA from a subject, comprising:

- (a) providing at least 10 ng of cell-free DNA obtained from a bodily sample of the subject;
- (b) attaching tags comprising barcodes having from 5 to 1000 distinct barcode sequences to said cell-free DNA obtained from said bodily sample of the subject, to generate non-uniquely tagged parent polynucleotides, wherein each barcode sequence is at least 5 nucleotides in length;
- (c) amplifying the non-uniquely tagged parent polynucleotides to produce amplified non-uniquely tagged progeny polynucleotides;
- (d) sequencing the amplified non-uniquely tagged progeny polynucleotides to produce a plurality of sequence reads from each parent polynucleotide, wherein each sequence read comprises a barcode sequence and a sequence derived from cell-free DNA;
- (e) grouping the plurality of sequence reads produced from each non-uniquely tagged parent polynucleotide into families based on i) the barcode sequence and ii) at least one of: sequence information at a beginning of the sequence derived from cell-free DNA, sequence information at an end of the sequence derived from cell-free DNA, and length of the sequence read, whereby each family comprises sequence reads of non-uniquely tagged progeny polynucleotides amplified from a unique polynucleotide among the non-uniquely tagged parent polynucleotides;
- (f) comparing the sequence reads grouped within each family to each other to determine consensus sequences for each family, wherein each of the consensus sequences corresponds to a unique polynucleotide among the non-uniquely tagged parent polynucleotides;
- (g) providing one or more reference sequences from a human genome, said one or more reference sequences comprising one or more loci of reported tumor markers, wherein each of the reported tumor markers is a single nucleotide variant;
- (h) identifying consensus sequences that map to a given locus of said one or more loci of reported tumor markers; and
- (i) calculating a number of consensus sequences that map to the given locus that include the single nucleotide variant thereby quantifying single nucleotide variant tumor markers in said cell-free DNA from said subject.

15. Performance of Foundation's FoundationACT test leads to infringement of this claim in the following way. First, in FoundationACT, more than 10 ng of cell free DNA is obtained from a patient blood draw (step a). Tags comprising barcodes are then attached to both ends of the DNA fragments that are present in the sample of cell free DNA (step b). The tagged DNA

sample is then subject to PCR amplification (step c). The amplified DNA is then subject to sequencing on the Illumina sequencing platform, resulting in sequence reads that consist of a barcode sequence and a sequence present in the cell free DNA (step d). The sequence reads are (i) grouped into families based on the barcode and additional sequence information, allowing one to collect sequence information that arises from the same DNA molecule (step e), (ii) compared to one another to arrive at a “consensus sequence” that represents a more accurate determination of the sequence of the molecule in question (step f), and mapped to a reference genome to identify sequences that map to regions of the genome associated with cancer tumor markers (steps f-h). Finally, the number of tumor markers present in the original sample are quantified (step i).

16. As an example, attached hereto as Exhibit 7 is a preliminary and exemplary claim chart detailing Foundation’s infringement of multiple claims of the ’731 patent. This chart is not intended to limit Guardant’s right to modify this chart or any other claim chart or allege that other activities of Foundation infringe the identified claims or any other claims of the ’731 patent or any other patents.

17. Foundation infringes, literally or under the doctrine of equivalents, Guardant’s ’822 patent through its activities connected to its performance of the Foundation ACT test. For instance, representative claim 1 of the ’822 patent is listed below:

1. A method, comprising:
  - (a) providing a population of cell free DNA (“cfDNA”) molecules obtained from a bodily sample from a subject;
  - (b) converting the population of cfDNA molecules into a population of non-uniquely tagged parent polynucleotides, wherein each of the non-uniquely tagged parent polynucleotides comprises (i) a sequence from a cfDNA molecule of the population of cfDNA molecules, and (ii) an identifier sequence comprising one or more polynucleotide barcodes;
  - (c) amplifying the population of non-uniquely tagged parent polynucleotides to produce a corresponding population of amplified progeny polynucleotides;

- (d) sequencing the population of amplified progeny polynucleotides to produce a set of sequence reads;
- (e) mapping sequence reads of the set of sequence reads to one or more reference sequences from a human genome;
- (f) grouping the sequence reads into families, each of the families comprising sequence reads comprising the same identifier sequence and having the same start and stop positions, whereby each of the families comprises sequence reads amplified from the same tagged parent polynucleotide;
- (g) at each genetic locus of a plurality of genetic loci in the one or more reference sequences, collapsing sequence reads in each family to yield a base call for each family at the genetic locus; and
- (h) determining a frequency of one or more bases called at the locus from among the families.

18. Performance of Foundation's FoundationACT test leads to infringement of this claim in the following way. First, in FoundationACT, cell free DNA is obtained from a patient blood draw (step a). Tags comprising barcodes are then attached to both ends of the population of DNA fragments that are present in the sample of cell free DNA (step b). The tagged DNA sample is then subject to PCR amplification (step c). The amplified DNA is then subject to sequencing on the Illumina sequencing platform, resulting in sequence reads that consist of a barcode sequence and a sequence present in the cell free DNA (step d). Sequence reads are (i) compared to reference sequences from databases such as the COSMIC database (step e), (ii) grouped into families based on the barcode and additional sequence information, allowing one to collect sequence information that arises from the same DNA molecule (step f), and (iii) compared to one another to arrive at a "consensus sequence" that yields a consensus base call at any position in the sequence (step g). Finally, the frequency of specific bases in the form of tumor markers present in the original sample are quantified (step h).

19. As an example, attached hereto as Exhibit 8 is a preliminary and exemplary claim chart detailing Foundation's infringement of multiple claims of the '822 patent. This chart is not intended to limit Guardant's right to modify this chart or any other claim chart or allege that other

activities of Foundation infringe the identified claims or any other claims of the '822 patent or any other patents.

20. Foundation infringes, literally or under the doctrine of equivalents, Guardant's '743 patent through its activities connected to its performance of the Foundation ACT test. For instance, representative claim 1 of the '743 patent is listed below:

1. A method for detecting copy number variation, comprising:
  - (a) sequencing extracellular polynucleotides from a bodily sample from a subject, wherein each of the extracellular polynucleotides generates a plurality of sequence reads;
  - (b) filtering out reads that fail to meet a set accuracy, quality score, or mapping score threshold;
  - (c) mapping the plurality of sequence reads to a reference sequence;
  - (d) quantifying mapped reads or unique sequence reads in a plurality of predefined regions of the reference sequence; and
  - (e) determining copy number variation in one or more of the plurality of predefined regions by: i) normalizing a number of reads in the plurality of predefined regions to each other, or a number of unique sequence reads in the plurality of predefined regions to each other; and/or ii) processing a number of reads in the plurality of predefined regions or a number of unique sequence reads in the plurality of predefined regions with numbers obtained from a control sample.

21. Performance of Foundation's FoundationACT test leads to infringement of claim 1 in the following way. First, in FoundationACT, cell-free DNA is amplified and sequenced, generating a plurality of reads (step a). Second, the plurality of sequences are grouped together to form consensus sequences and errors in individual sequence reads are removed (step b). The consensus sequence is then mapped to a reference sequence (step c) and the percentage of variants such as copy number variants are quantified (steps d-e).

22. As an example, attached hereto as Exhibit 9 is a preliminary and exemplary claim chart detailing Foundation's infringement of multiple claims of the '743 patent. This chart is not intended to limit Guardant's right to modify this chart or any other claim chart or allege that other

activities of Foundation infringe the identified claims or any other claims of the '743 patent or any other patents.

23. Foundation infringes, literally or under the doctrine of equivalents, Guardant's '992 patent through its activities connected to its performance of the Foundation ACT test. For instance, representative claim 1 of the '992 patent is listed below:

1. A method for detecting genetic aberrations in cell-free DNA ("cfDNA") molecules from a subject, comprising:

- (a) providing cfDNA molecules obtained from a bodily sample of the subject;
- (b) attaching tags comprising barcodes having a plurality of different barcode sequences to the cfDNA molecules to tag at least 20% of the cfDNA molecules, which attaching comprises ligating adaptors comprising the barcodes to both ends of the cfDNA molecules, wherein ligating comprises using more than 10X molar excess of the adaptors as compared to the cfDNA molecules, thereby generating tagged parent polynucleotides;
- (c) amplifying the tagged parent polynucleotides to produce amplified tagged progeny polynucleotides;
- (d) sequencing the amplified tagged progeny polynucleotides to produce a plurality of sequence reads from each of the tagged parent polynucleotides, wherein each sequence read of the plurality of sequence reads comprises a barcode sequence and a sequence derived from a cfDNA molecule of the cfDNA molecules;
- (e) mapping sequence reads of the plurality of sequence reads to one or more reference sequences from a human genome;
- (f) grouping the sequence reads mapped in e) into families based at least on barcode sequences of the sequence reads, each of the families comprising sequence reads comprising the same barcode sequence, whereby each of the families comprises sequence reads amplified from the same tagged parent polynucleotide;
- (g) at each of a plurality of genetic loci in the one or more reference sequences, collapsing sequence reads in each family to yield a base call for each family at the genetic locus; and
- (h) detecting, at one or more genetic loci, a plurality of genetic aberrations, wherein the plurality of genetic aberrations comprises two or more different members selected from the group of members consisting of a single base substitution, a copy number variation (CNV), an insertion or deletion (indel), and a gene fusion.

24. Performance of Foundation's FoundationACT test leads to infringement of claim 1 in the following way. First, in FoundationACT, cfDNA is extracted from blood (step a). Next, barcodes are ligated to each end of cfDNA generating tagged parent polynucleotides (step b). The tagged parent polynucleotides containing the ligated barcodes are then amplified (step c) and sequenced using an Illumina platform to generate a plurality of sequence reads (step d). This plurality of sequence reads are mapped to a human genome (step e) and are then grouped according to their barcode sequence such that sequence reads amplified from the same tagged parent polynucleotide can be identified (step f). Lastly, FoundationACT generates a base call at a plurality of loci from the plurality of sequence reads (step g) and uses that base call to detect a plurality of genetic aberrations including base substitutions, copy number variations, insertions or deletions, and gene fusions (step h).

25. As an example, attached hereto as Exhibit 10 is a preliminary and exemplary claim chart detailing Foundation's infringement of multiple claims of the '992 patent. This chart is not intended to limit Guardant's right to modify this chart or any other claim chart or allege that other activities of Foundation infringe the identified claims or any other claims of the '992 patent or any other patents.

### **COUNT I**

#### **(Infringement of U.S. Patent No. 9,598,731)**

26. Guardant repeats and re-alleges the foregoing paragraphs as if set forth specifically herein.

27. On March 21, 2017, the United States Patent and Trademark Office duly and legally issued the '731 patent, entitled "Systems and Methods to Detect Rare Mutations and Copy Number Variation," which is solely assigned to Guardant. Guardant is the owner of all rights, title to and interest in the '731 patent.

28. On information and belief, Foundation has infringed and continues to infringe at least claims 1-3, 6-9, 12 and 16-17 of the '731 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by performing within the United States without authority the FoundationACT test. As an example, attached as Exhibit 7 is a preliminary and exemplary claim chart detailing Foundation's infringement of these claims of the '731 patent. This chart is not intended to limit Guardant's right to modify the chart or allege that other activities of Guardant infringe the identified claims or any other claims of the '731 patent or any other patents.

29. Exhibit 7 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 7 that is mapped to Foundation's FoundationACT test shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

## **COUNT II**

### **(Infringement of U.S. Patent No. 9,834,822)**

30. Guardant repeats and re-alleges the foregoing paragraphs as if set forth specifically herein.

31. On December 5, 2017, the United States Patent and Trademark Office duly and legally issued the '822 patent, entitled "Systems and Methods to Detect Rare Mutations and Copy Number Variation," which is solely assigned to Guardant. Guardant is the owner of all rights, title to and interest in the '822 patent.

32. On information and belief, Foundation has infringed and continues to infringe at least claims 1-3, 5-9, 11, 13, 18, and 20 of the '822 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by performing within the United States without authority the FoundationACT test. As an example, attached as Exhibit 8 is a preliminary and exemplary claim chart detailing Foundation's infringement of these claims of the '822 patent. This chart is not

intended to limit Guardant's right to modify the chart or allege that other activities of Guardant infringe the identified claims or any other claims of the '822 patent or any other patents.

33. Exhibit 8 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 8 that is mapped to Foundation's FoundationACT test shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

### **COUNT III**

#### **(Infringement of U.S. Patent No. 9,840,743)**

34. Guardant repeats and re-alleges the foregoing paragraphs as if set forth specifically herein.

35. On December 12, 2017, the United States Patent and Trademark Office duly and legally issued the '743 patent, entitled "Systems and Methods to Detect Rare Mutations and Copy Number Variation," which is solely assigned to Guardant. Guardant is the owner of all rights, title to and interest in the '743 patent.

36. On information and belief, Foundation has infringed and continues to infringe at least claims 1-7, 9-13, and 15-26 of the '743 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by performing within the United States without authority the FoundationACT test. As an example, attached as Exhibit 9 is a preliminary and exemplary claim chart detailing Foundation's infringement of these claims of the '743 patent. This chart is not intended to limit Guardant's right to modify the chart or allege that other activities of Guardant infringe the identified claims or any other claims of the '743 patent or any other patents.

37. Exhibit 9 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 9 that is mapped to Foundation's FoundationACT test shall be considered an allegation

within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

**COUNT IV**

**(Infringement of U.S. Patent No. 9,902,992)**

38. Guardant repeats and re-alleges the foregoing paragraphs as if set forth specifically herein.

39. On February 27, 2018, the United States Patent and Trademark Office duly and legally issued the '992 patent, entitled "Systems and Methods to Detect Rare Mutations and Copy Number Variation," which is solely assigned to Guardant. Guardant is the owner of all rights, title to and interest in the '992 patent.

40. On information and belief, Foundation has infringed and continues to infringe at least claims 1-2, 4-7, 11-13, and 17-22 of the '992 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by performing within the United States without authority the FoundationACT test. As an example, attached as Exhibit 10 is a preliminary and exemplary claim chart detailing Foundation's infringement of these claims of the '992 patent. This chart is not intended to limit Guardant's right to modify the chart or allege that other activities of Guardant infringe the identified claims or any other claims of the '992 patent or any other patents.

41. Exhibit 10 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 10 that is mapped to Foundation's FoundationACT test shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

**JURY DEMAND**

42. Guardant demands a jury trial on all issues so triable.

**PRAYER FOR RELIEF**

WHEREFORE, Guardant prays that this Court grant the following relief:

A. A judgment that Foundation has infringed the '731 patent, the '822 patent, the '743 patent and/or the '992 patent and that the '731 patent, the '822 patent, '743 patent, and/or the '992 patent are valid.

B. Damages or other monetary relief, including, but not limited to, costs and pre- and post-judgment interest, to Guardant;

C. An order enjoining Foundation and its officers, directors, agents, servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all others acting in active concert therewith from further infringement of the '731 patent, the '822 patent, the '743 patent, and/or the '992 patent;

D. Such further and other relief as this Court deems proper and just, including, but not limited to, a determination that this is an exceptional case under 35 U.S.C. § 285 and an award of attorneys' fees and costs to Guardant in this action.

Dated: March 6, 2018

Respectfully submitted,

FARNAN LLP

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