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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RAVINDER ABROL, WILLIAM A. GODDARD,
ADAM R. GRIFFITH, and VICTOR WAI TAK KAM¹

Appeal 2017-000910
Application 12/142,707
Technology Center 1600

Before DONALD E. ADAMS, ULRIKE W. JENKS, and
TAWEN CHANG, *Administrative Patent Judges*.

CHANG, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a method for predicting protein structures, which have been rejected as directed to a patent-ineligible abstract idea. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

STATEMENT OF THE CASE

The Specification states that its disclosures relate to “methods for predicting three-dimensional structures for [α -helical membrane proteins

¹ Appellants identify the Real Party in Interest as California Institute of Technology. (Appeal Br. 2.)

(HMPs)] and their use in designing selective HMP[] ligands.” (Spec. ¶ 3.) According to the Specification, current methods for determining 3D protein structures, such as protein crystallography and homology computation, are inadequate for determining HMP structures for purposes such as drug design.

Claims 1–8 and 10–30 are on appeal. Claim 1 is illustrative and reproduced below:

1. A method for predicting protein structures of an α -helical membrane protein (HMP), the α -helical membrane protein including M α helices, M being an integer greater than or equal to 3, the method comprising:
 - predicting transmembrane (TM) amino acid sequences of the HMP;
 - constructing individual TM helical structures of the HMP based on said predicted TM amino acid sequences;
 - defining a set of candidate M-helix bundle conformations, each conformation comprising constructed individual TM helical structures;
 - partitioning interactions between the constructed individual TM helical structures of the M-helix bundle into (M-the integer)-helix sub-bundle interactions,
$$1 \leq \text{the integer} \leq 2$$
 - , wherein each (M-the integer)-helix sub-bundle interaction is associated with an (M-the integer)-helix sub-bundle energy;
 - estimating bundle conformation interaction energies of the defined set of candidate M-helix bundle conformations, wherein the estimating is based on a combination of all of the (M-the integer)-helix sub-bundle energies;
 - based on the estimated bundle conformation interaction energies of the defined set, selecting a first subset of conformations for binding of the HMP to HMP ligands suitable to bind to the HMP;
 - assembling an explicit M-helix bundle for each conformation of said first subset of conformations;

for each said conformation of said first subset of conformations, evaluating interaction energies among all M helices;

based on the evaluated interaction energies among all M helices, selecting a second subset of conformations, said second subset being a subset of the first subset; and

identifying relevant HMP structures based upon binding of ligands to said second subset of conformations.

(Appeal Br. 19–20 (Claims App.).)

The Examiner rejects claims 1–8 and 10–30 under 35 U.S.C. § 101 as being directed to a patent-ineligible abstract idea.² (Ans. 2.)

DISCUSSION

Issue

The Examiner concludes that the claims are directed to “a computational modeling method drawn to modeling protein helical structures, calculating and evaluating interaction energies among helices in sub-bundles and bundles, assembling helical bundle based on calculated interaction energies, and making a selection of conformations.” (Ans. 2.)

Thus, the Examiner concludes that the claims are directed to an abstract idea because

the claims are directed to processing information and converting one form of numerical representation into another. In other words, the claimed method simply describes the concept of gathering and combining data by reciting steps of organizing information through

² The Examiner has withdrawn the rejection of claims 1–8 and 10–30 under 35 U.S.C. § 103(a). (Ans. 2.)

mathematical relationships to generate additional information.

(*Id.* at 2–3.) The Examiner further finds that the claims do not include additional elements that amount to significantly more than the judicial exception. (*Id.* at 3–5.)

Appellants contend that computer implemented methods are not per se abstract “merely because computers enact methods through computations” and further contend that *Alice* does not “impose physicality as a requirement” for patent eligibility. (Appeal Br. 7, 14; *see also* Reply Br. 3–4.) Appellants contend that courts have not yet addressed “computer simulation of physical systems” with respect to 35 U.S.C. § 101, and that the claims at issue “are not dealing with something as abstract as ‘economic value’” or “mathematical formulas or algorithms regarding numbers as numbers in and of themselves.” (Appeal Br. 9.) Appellants contend that “at least the method step ‘constructing individual TM helical structures of the HMP based on said predicted TM amino acid sequences’ is not a step that ‘can be performed mentally.’” (Reply Br. 3.)

Appellants also contend that, even if the claims were directed to an exception under 35 U.S.C. § 101, they recite additional elements that amount to “significantly more than the proposed abstract idea of ‘processing information and mathematical relationships.’” (Appeal Br. 10.) In particular, Appellants contend that the claims are “[r]elated to an improvement in a technological art” and also do not preempt an abstract idea. (*Id.* at 10–14; *see also* Reply Br. 4–7.) Appellants contend that, even if independent claim 1 is found to be patent ineligible, dependent claims such as claim 10 are patent eligible because they recite methods “with an even higher level of specificity than claim 1.” (Appeal Br. 15.)

The issue with respect to this rejection is whether the claims are directed to an abstract idea without significantly more.

Analysis

In determining whether a claim is directed to patent ineligible subject matter, we apply the analytical framework set out in *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012) and elaborated by *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347 (2014):

First, we determine whether the claims at issue are directed to [laws of nature, natural phenomena, or abstract ideas]. If so, we then ask, “[w]hat else is there in the claims before us?” To answer that question, we consider the elements of each claim both individually and “as an ordered combination” to determine whether the additional elements “transform the nature of the claim” into a patent-eligible application. [The Supreme Court has] described step two of this analysis as a search for an “inventive concept” – i.e., an element or combination of elements that is “sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.”

Alice, 134 S.Ct. at 2355 (second and fourth alternations original) (citations omitted).

“The second step of the *Alice* test is satisfied when the claim limitations involve more than performance of well-understood, routine, [and] conventional activities previously known to the industry.” *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1367 (Fed. Cir. 2018) (internal quotation marks omitted). In *Berkheimer*, the Federal Circuit explained that “[t]he question of whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact.” *Id.* at 1368. The Federal Circuit further held that “[w]hether a

particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art,” and “[t]he mere fact that something is disclosed in a piece of prior art . . . does not mean it was well-understood, routine, and conventional.” *Id.*

In the present case, we are persuaded the preponderance of the evidence does not support the Examiner’s conclusion that the rejected claims recite patent-ineligible subject matter. Assuming we agreed with the Examiner that the rejected claims are directed to an abstract idea—i.e., “processing information and converting one form of numerical representation into another” or “gathering and combining data by reciting steps of organizing information through mathematical relationships to generate additional information”—we would still find that the Examiner has not sufficiently shown that the claims’ additional features constitute well-understood, routine, and conventional activity.

The Examiner states with respect to claims 1–8 and 10–29 that “the claimed method is wholly directed to an abstract idea.” (Ans. 5.) More particularly, the Examiner states that “[t]here are no meaningful limitations in the claims . . . beyond generally linking the use of an abstract idea to a particular technological environment” (*id.* at 3); that “[t]here is no expressed or inherent recitation of a machine or transformation” in the claims (*id.* at 5); and that the claim language does not preclude carrying out performing the claimed method by hand (*id.*).

As to claim 30, which recites “[a] physical computer readable medium comprising computer executable software code” that, “upon execution, carries out the method of claim 1,” the Examiner additionally states that “[t]he hardware addressed in the claim, computer-readable medium, does not

offer a meaningful limitation beyond generally linking to a particular technological environment, that is, implementation via computers[,] and amounts to no more than a recitation of generic structure that serves to perform generic functions.” (Ans. 3–4.)

The Examiner states further that “[t]he claims do not recite either inventive steps outside of data manipulation[] or improvements to the functioning of the computer itself.” (Ans. 4).

The Examiner provides no evidence or other support for these conclusory statements. For example, the Examiner cites to no statements in the Specification regarding what is well-known, routine, and conventional, and has withdrawn the rejection of the claims as obvious under 35 U.S.C. § 103(a). *Berkheimer*, 881 F.3d at 1368 (holding that whether claim elements are well-understood, routine and conventional is a question of fact). To the extent the Examiner’s position is that the claims do not contain *any* limitations in addition to an abstract idea, the Examiner does not explain how limitations such as “constructing individual TM helical structures of the HMP based on said predicted TM amino acid sequences” would be considered “converting one of numerical representation into another” or “organizing information through mathematical relationships.” Likewise, while we agree that mental processes are excluded from section 101, the Examiner does not provide any evidence, from the Specification or otherwise, to support a finding that such construction may be done by hand.³

³ With respect to the Examiner’s statement that “[t]here is no expressed or inherent recitation of a machine or transformation” in the claims, we note that “there is nothing that requires a method ‘be tied to a machine or transform an article’ to be patentable.” *McRO, Inc. v. Bandai Namco Games America Inc.*, 837 F.3d 1299, 1315 (Fed. Cir. 2016).

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Thus, at least on the record before us, we find that the Examiner has not established a prima facie case that the claims are patent ineligible under 35 U.S.C. § 101.

SUMMARY

For the reasons above, we reverse the Examiner's decision rejecting claims 1–8 and 10–30.

REVERSED