

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JACQUES R. FRESCO, BIN LIU and LYNN C. KLOTZ

Appeal No. 1998-2648
Application 08/473,888

ON BRIEF

Before ROBINSON, MILLS, and GRIMES, Administrative Patent Judges.

GRIMES, Administrative Patent Judge.

DECISION ON APPEAL

An oral hearing in this case was scheduled for April 24, 2001. Upon reviewing the case, however, we have determined that an oral hearing will not be necessary and we render the following decision based on the record.

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 -14.¹ Claim 1 is representative and reads as follows:

¹ Claims 15-23 are also pending but have been withdrawn from consideration following a restriction requirement.

1. An oligonucleotide containing a backbone having a polarity associated therewith, and nucleotide bases and at least one synthetic residue bound to the backbone, the bases and residue(s) of said oligonucleotide being effective to bind in a sequence-specific manner to a target sequence of a duplex polynucleotide, said oligonucleotide capable of binding in a parallel orientation relative to a purine-rich or designated core or center strand of said duplex, said nucleotide bases consisting essentially of pyrimidine bases and/or base analogs thereof, and said residue(s) being substantially planar, such that when the oligonucleotide binds to the target sequence, base triplets are formed among each oligonucleotide base or residue and the corresponding bases of the duplex with at least one residue binding to an inverted base pair, and each residue conforms to the following parameters:

- a) the radius of the imaginary circle connecting the C1' ends of the two glycosyl bonds of the target base pair of the duplex polynucleotide and the atom of the oligonucleotide backbone which is linked to the corresponding residue of the oligonucleotide is from about 7.0 Å to about 8.6 Å;
- b) the Θ value, measured from the C1' atom bound to the base in the core or center strand, to the atom of the oligonucleotide backbone which is bound to the residue, is from about 53° to about 82°
- c) the ζ value indicating the angle between said imaginary circle radius passing through the atom of the residue which is bound to the oligonucleotide backbone, and the bond vector between the residue and the oligonucleotide backbone, is from -90° to about +90°; and
- d) the residue forms a total of at least two hydrogen bonds with one or both bases of the corresponding target base pair of the duplex.

The examiner relies on the following reference:

Toole WO 92/10590 June 25, 1992

Claims 2-5 and 11-14 stand rejected under 35 U.S.C. § 112, first paragraph, as unsupported by an adequate written description.

Claims 1-14 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite.

Claims 1-13 stand rejected under 35 U.S.C. § 102(b) as anticipated by, or alternatively under 35 U.S.C. § 103 as obvious over, Toole.

We reverse all of the rejections.

Background

Appellants' specification discloses oligonucleotides which hybridize to double-stranded DNA and form triple-helix ("triplex") structures. The specification acknowledges that triplex-forming oligos were known in the prior art, but states that they had the "serious practical limitation" of requiring

runs of purines in the center target strand of typically 10 or more bases interrupted by only one or two pyrimidines (hereafter called "purine-rich" sequences or targets). While runs of sufficient length are present in many of the genes and the non-gene DNA (or RNA) of eukaryotes and prokaryotes and their viruses, they are not frequent enough for widespread diagnostic and therapeutic uses.

Page 3, lines 18-25.

The specification states that

a major object of the present invention is to provide synthetic nucleic acid monomers ("residues"), that when incorporated into an oligonucleotide ("third strand"), or analog oligomer, i.e., a third strand with a synthetic backbone, enables the third strand to form a triple-stranded nucleic acid ("triplex") when hybridized to a double-stranded nucleic acid ("duplex"), wherein the "target region" to which the third strand binds is of substantially any base sequence; that is, it need not include a run of a large number of adjacent purines on one strand. In other words, the residues that are provided will be capable of *strong* and *specific* binding to inverted base pairs.

Page 6, lines 24-36 (emphasis in original). The specification and independent claims 1-10 define the physical parameters of the "synthetic residues" that are necessary to enable binding to non-purine-rich sequences.

Discussion

1. The written description rejection.

Claims 2-5 specify that the “synthetic residue” in the claimed oligonucleotides is not 2,6-diaminopurine. The examiner rejected these claims, and dependent claims 11-14, as unsupported by an adequate written description because, in his view, the specification provides no basis for excluding 2,6-diaminopurine from the “synthetic residues” that can be incorporated into the claimed oligos.

Appellants argue that, when the claims are read in light of the specification, it is clear that 2,6-diaminopurine is a “base analog” and not a “synthetic residue” at all. Thus, they argue, the language added to the claims merely clarifies that 2,6-diaminopurine is not a synthetic residue. In support of their position, Appellants point to Table 2 of the specification.

We agree with Appellants that the claims are adequately supported by the specification. During examination, claims are given their broadest reasonable interpretation, in light of the specification. See In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983) (“It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their broadest reasonable interpretation consistent with the specification.”). The specification and claims draw a distinction between “synthetic residues” and “base analogs.” For example, claim 1 recites an “oligonucleotide containing . . . nucleotide bases and at least one synthetic residue . . . said nucleotide bases consisting essentially of pyrimidine bases and/or base analogs thereof.” Table 2 of the specification

expressly states that 2,6-diaminopurine (“2,6 DAP”) is an “analog” of adenine (“A”). See page 4. Thus, the only reasonable interpretation of the claim language, in light of the specification, is that 2,6-diaminopurine is not a “synthetic residue.” Appellants’ amendment of the claim language adds nothing substantive to the claims and is fully supported by the specification.

2. The indefiniteness rejections.

The examiner rejected all of the claims because they use “consisting essentially of” language to define a genus of chemical compounds. The examiner argues that, while “consisting essentially of” language is appropriate for claims to compositions, it is indefinite when used to define the make-up of the claimed chemical compounds.

Appellants argue that “consisting essentially of” language has been held to be proper with respect to both composition claims and method claims, and that it is equally applicable to the instantly claimed compounds. In addition, Appellants note that the specification (page 57) expressly states that at least 5 out of 7 bases in the claimed oligos must be so-called “motif” bases in order for them to retain their triplex-forming property.

Although we understand the examiner’s general concern that “consisting essentially of” language can be problematic when applied to chemical compounds, we conclude that the present claims are not indefinite. The claimed oligos are polymers made up of several different subunits, some of which are nucleotide bases or base analogs. Nucleotide bases can be either pyrimidines or purines, which can be present in any proportion in an otherwise undefined

nucleic acid. With respect to the instantly claimed oligos, however, the proportion of pyrimidines (or pyrimidine analogs) and purines (or purine analogs) can change the essential properties of the oligos, i.e., their ability to form a triplex with a specific nucleotide sequence.

The specification expressly states that the proportion of “non-motif” bases at a proportion greater than 2 out of 7 will interfere with this essential property. See page 57 (“According to the present invention, the frequency of determinative bases and/or base analogs plus synthetic residues is no less than five out of seven.”). Thus, reading the language of, e.g., claim 1 in light of the specification, it is clear that “consisting essentially of pyrimidine bases and/or base analogs thereof,” means that at least 5 out of every 7 bases in the claimed oligo is a pyrimidine, pyrimidine analog, or synthetic residue. We conclude, therefore, that the use of “consisting essentially of” in the instant claims does not render them indefinite.

The examiner also rejected claims 4 and 5 as allegedly indefinite because 2,6-diaminopurine is expressly excluded (“at least one synthetic residue (not 2,6-diaminopurine)”) and is also recited as a possible “base analog.”

As we noted above with respect to the rejection for inadequate written description, the only reasonable interpretation of the claims, in light of the specification, is that 2,6-diaminopurine is a “base analog” and not a “synthetic residue.” The language of claims 4 and 5 simply makes this distinction expressly, and the claims are therefore not indefinite.

3. The anticipation/obviousness rejection.

The examiner rejected claims 1-13 as anticipated by, or alternatively as obvious over, Toole. The examiner reasoned that Toole teaches triplex-forming oligonucleotides composed of purines, pyrimidines, and modified base analogs, that Toole teaches “a variety of triplex binding motifs including the pyrimidine parallel, purine antiparallel, and inverted polarity,” and that Toole teaches oligonucleotides having a variety of backbones. Examiner’s Answer, pages 5-6. The examiner concluded that Toole anticipates the instant claims, or at least, “[i]t would have been prima facie obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Toole to synthesize triplex forming oligonucleotides.” Id., page 6.

“Under 35 U.S.C. § 102, every limitation of a claim must identically appear in a single prior art reference for it to anticipate the claim.” Gechter v. Davidson, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir. 1997). “[I]t is elementary that the mere recitation of a newly discovered function or property, inherently possessed by things in the prior art, does not cause a claim drawn to those things to distinguish over the prior art.” In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977) (quoting In re Swinehart, 439 F.2d 210, 212, 169 USPQ 226, 229 (CCPA 1971)). However, “the examiner must provide some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art” before the burden is shifted to the applicant to disprove the inherency. Ex parte Skinner, 2 USPQ2d 1788, 1789 (Bd. Pat. App. Int. 1986).

In this case, the examiner has provided no evidence or scientific reasoning to suggest that the oligonucleotides disclosed by Toole comprise at least one “synthetic residue” having the properties recited in the claims. Rather, the examiner states that “Applicant provides no definition for the term ‘synthetic’ in the specification and provides no basis in the specification for distinguishing the term ‘analog’ as being anything other than a synonym to the word ‘synthetic.’” Examiner’s Answer, page 9. The examiner’s position therefore seems to be that the nucleotide analogs disclosed by Toole are encompassed within the instant claims’ recitation of “synthetic residue.” With respect to the specific parameters recited in the claims, the examiner argues that it is Appellants’ burden to show that the prior art compounds do not meet these limitations. See the Examiner’s Answer, page 11 (“The patent office lacks the facilities to determine whether any specific oligonucleotide meets the functional tests such as specific bond angles.”).

The examiner’s analysis is incorrect. The burden shifts to the applicant only if the examiner can show, by evidence or scientific reasoning, a reasonable basis for concluding that the prior art product meets all the limitations of the claims. The examiner has provided no basis for such a conclusion in this case.

In fact, the evidence of record suggests that the oligonucleotides disclosed by Toole do not comprise a “synthetic residue” having the parameters recited in the claims. Toole states that the oligos disclosed therein bind only to purine-rich targets. See page 3, lines 12-15 (“It should be said, initially, that in all instances, a concentration of purine residues along a portion of a single strand of the

targeted duplex is required.”). The specification, on the other hand, states that oligos comprising the recited “synthetic residues” can form triplexes with sequences that are not purine-rich. See page 6, lines 24-36 (emphasis added):

a major object of the present invention is to provide synthetic nucleic acid monomers (“residues”), that . . . enables [sic] the third strand to form a triple-stranded nucleic acid (“triplex”) . . ., wherein the “target region” to which the third strand binds is of substantially any base sequence; that is, it need not include a run of a large number of adjacent purines on one strand.

Thus, the evidence in the record supports Appellants’ position that the prior art oligos do not meet the limitations of the instant claims. The examiner has provided no evidence or scientific reasoning in rebuttal, nor has he suggested a reasonable basis for concluding that the missing limitations would have been obvious based on the cited reference. Therefore, we reverse the § 102(b)/103 rejection.

Summary

The instant claims are definite and adequately described by the specification, and the evidence of record does not support the examiner's position that the prior art oligonucleotides inherently possess all of the properties recited in the instant claims. We therefore reverse all of the rejections on appeal.

REVERSED

Douglas W. Robinson)	
Administrative Patent Judge)	
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)	
)	BOARD OF PATENT
Demetra J. Mills)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
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