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The time period for reply, if any, is set in the attached communication.
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JEFFREY J. ZACHWIEJA

Appeal 2014-004689
Application 13/092,199
Technology Center 1600


MILLS, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134. The Examiner has rejected the claims for anticipation and obviousness. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

STATEMENT OF CASE

The following claims are representative.

1. A method of reducing oxidative modification of one or more proteins or other cellular constituents involved in muscle cell contraction comprising administering one or more antioxidant compounds to an individual engaged in an exercise regimen in an amount sufficient to reduce oxidative modification of the one or more proteins or other cellular constituents.

2. The method of claim 1 wherein the protein is myosin heavy chain protein.
3. The method of claim 2 wherein the antioxidant compound is 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid.

4. A method of reducing muscle fatigue in an individual comprising administering one or more antioxidant compounds to an individual engaged in an exercise regimen in an amount sufficient to reduce oxidative modification of one or more proteins or other cellular constituents involved in muscle cell contraction.

5. The method of claim 4 wherein the protein is myosin heavy chain protein.

6. The method of claim 5 wherein the antioxidant compound is 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid.

7. A method of increasing muscle performance during exercise comprising administering one or more antioxidant compounds to an individual engaged in an exercise regimen in an amount sufficient to reduce oxidative modification of one or more proteins or other cellular constituents involved in muscle cell contraction.

8. The method of claim 7 wherein the protein is myosin heavy chain protein.

9. The method of claim 8 wherein the antioxidant compound is 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid.

25. The method of claim 1 wherein the antioxidant is administered to the individual to achieve a blood concentration of the antioxidant of about 1 mM.

28. The method of claim 4 wherein the antioxidant is administered to the individual to achieve a blood concentration of the antioxidant of about 1 mM.

31. The method of claim 7 wherein the antioxidant is administered to the individual to achieve a blood concentration of the antioxidant of about 1 mM.
Grounds of Rejection

1. Claims 1, 2, 4, 5, 7, 8, and 23–31 remain rejected under 35 U.S.C. §102(b) as being anticipated by Reid.
2. Claims 3, 6, and 9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Reid in view of Betters.

FINDINGS OF FACT

The Examiner’s findings of fact are set forth in the Final Action at pages 2–6.

PRINCIPLES OF LAW

In making our determination, we apply the preponderance of the evidence standard. See, e.g., Ethicon, Inc. v. Quigg, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 416 (2007).

Where . . . the claimed and prior art products are identical or substantially identical, or are produced by identical or
substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. Whether the rejection is based on ‘inherency’ under 35 U.S.C. § 102, on ‘prima facie obviousness’ under 35 U.S.C. § 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO’s inability to manufacture products or to obtain and compare prior art products.

In re Best, 562 F.2d 1252, 1255 (CCPA 1977) (footnote omitted) (citation omitted). The principles set forth in In re Best are also applicable to process or method claims as discussed in In re King, 801 F.2d 1324, 1327 (Fed. Cir. 1986).

Inherent anticipation does not require intent or recognition that a prior art process achieve a result which is claimed. “Inherency is not necessarily coterminous with the knowledge of those of ordinary skill in the art. Artisans of ordinary skill may not recognize the inherent characteristics or functioning of the prior art.” MEHL/Biophile Int’l Corp. v. Milgraum, 192 F.3d 1362, 1365 (Fed. Cir. 1999). “Newly discovered results of known processes directed to the same purpose are not patentable because such results are inherent.” Bristol-Myers Squibb v. Ben Venue Labs., 246 F.3d 1368, 1376 (Fed. Cir. 2001).

Rejection 1 — Anticipation Reid

We agree with the Examiner’s fact finding, statement of the rejection and responses to Appellant’s arguments as set forth in the Answer. We find that the Examiner has provided evidence to support a prima facie case of anticipation. We provide the following additional comment to the Examiner’s argument set forth in the Final Action and Answer. For claims which are not separately argued, we select claim 1 as representative. Claims
4, 7, and 23–31 fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv). Separately argued claims are addressed separately below.

The Examiner finds that Reid teaches each element claimed. In particular, Reid teaches:

- a method of reducing oxidative modification of muscle cell proteins (e.g. myosin heavy chain) comprising administering an antioxidant (e.g. NAC [N-acetylcysteine]) in an amount sufficient to oxidative modification of proteins in a frequency of administration prior to an exercise regimen (p. 172, left column, p. 176, left column, first paragraph). The treatment is taught to reduce muscle fatigue and improve endurance, i.e. muscle performance during exercise (p. 176, left column, first paragraph).

Final Act. 2–3.

Appellant contends that, “Reid fails to disclose administering one or more antioxidant compounds to achieve a reduction in modification of one or more proteins or other cellular constituents involved in muscle cell contraction, as required by the appealed claims.” App. Br. 9.

We are not persuaded and agree with the Examiner that Reid teaches the administration of the instantly claimed compound (i.e. an antioxidant) to the instantly claimed patient population (an individual engaged in an exercise regimen) at the instantly claimed dosage, i.e. in an amount sufficient to reduce fatigue/oxidative modification of proteins and products of identical chemical composition cannot exert mutually exclusive properties when administered under the same circumstances.

Ans. 4. The claims are not limited to any specific antioxidant or group of antioxidants, therefore, the claims encompass any antioxidant. Furthermore, Reid (citing Moopanar and Allen) discloses:
ROS [reactive oxygen species] oxidize critical sulphydryls on myofibrillar proteins to disulfides, thereby reducing calcium sensitivity... Alternatively, Andrade and associates ... have suggested that oxidants may act indirectly via redox-sensitive regulatory enzymes, e.g., kinases or phosphatases, which then modify myofibrillar proteins to depress function.

Reid 174, col. 1 (citations omitted). Reid suggests:

The controlling reaction seems to be ROS-induced oxidation of thiols on one or more regulatory proteins .... Protein thiol groups with high thiol/disulfide oxidation potentials are the most likely target for such reaction .... In cellular systems, oxidized protein thiols can be reduced via constitutive reaction pathways ..., providing a general mechanism by which ROS effects on calcium sensitivity could be reversed. This reasoning is consistent with the rapid reversibility of physiological fatigue by rest under some conditions ....

Reid went on to show that NAC pretreatment “slowed fatigue of human limb muscle” and “protects human respiratory muscle, i.e., diaphragm.” Reid 175, cols. 1 and 2.

Thus, Reid suggests the claimed method step and therefore inherently teaches the reduction of the one or more proteins or other cellular constituents involved in muscle cell contraction. Inherent anticipation does not require intent or recognition that a prior art process achieve a result which is claimed. MEHL/Biophile Int’l Corp., 192 F.3d at 1365. The Appellant has not shown that the dosage of Reid does not inherently result in the reduction of the one or more proteins or other cellular constituents involved in muscle cell contraction. “It is a general rule that merely discovering and claiming a new benefit of an old process cannot render the

Appellant additionally argues that Appellant’s Specification discloses that it was known in the art that NAC was unsuitable for treating muscle fatigue associated with intense, near-maximal muscle activity. Reply Br. 4–5. We are not persuaded. The pending claims are not limited to treating muscle fatigue associated with intense, near-maximal muscle activity. Reid discloses that NAC treats muscle fatigue and also inherently reduces oxidative modification of one or more proteins or other cellular constituents involved in muscle cell contraction.

**Claims 2**

Appellant contends, “Reid does not disclose detecting oxidative modification of myosin heavy chain protein, let alone disclose administering an antioxidant compound to decrease oxidative modification of myosin heavy chain protein, as required by dependent claims 2, 5 and 8.” App. Br. 14. We are not persuaded. Claims 5 and 8 are not separately argued and fall with claim 2. 37 C.F.R. § 41.37(c)(1)(iv).

In addition to Reid’s disclosure discussed above with respect to modification of myosin, myofibrillar proteins by reactive oxygen species, the pending claims do not require a step of “detecting oxidative modification of myosin heavy chain protein,” as argued by Appellant. The only active method step required by the claims is “administering one or more antioxidants” in a sufficient dosage amount. Reid teaches this method step.

Reid teaches the administration of the instantly claimed compound (i.e. an antioxidant), such as NAC to the instantly claimed patient population
(an individual engaged in an exercise regimen) at the instantly claimed
dosage, i.e. in an amount sufficient to reduce fatigue/oxidative modification
of proteins, including myosin heavy chain protein, and products of identical
chemical composition cannot exert mutually exclusive properties when
administered under the same circumstances. Ans. 4; Reid 171–172. The
Specification (at 13) discloses, “certain amounts of [an antioxidant] …
compound within the scope of the present invention include about 1 mg
compound per kg of body weight (1 mg/kg) to about 100 mg/kg, about 5
mg/kg to about 50 mg/kg, about 10 mg/kg to about 25 mg/kg, about 15
mg/kg to about 20 mg/kg.” Reid’s dosages overlap the claimed dose range
amount sufficient to reduce oxidative modification of the one or more
proteins or other cellular constituents disclosed in the Specification.
Appellant has not shown that the dosages of Reid (e.g., 176, col. 1) do not
overlap with the claimed dosage or that Reid’s dosage does not inherently
result in the reduction of the one or more proteins or other cellular
constituents involved in muscle cell contraction.

Claims 25

Claims 28 and 31 are not separately argued and, therefore, fall with
claim 25. 37 C.F.R. § 41.37(c)(1)(iv). Dependent claim 25 further requires
the antioxidant administered to the individual to achieve a blood
concentration of about 1 mM. Appellant argues that he “has discovered that
the pre-treatment of myotubes with 1 mM antioxidant resulted in a 42%
dercrease in oxidative modification of myosin heavy chain protein. (See
Example 3, pages 43-44 of the subject specification.).” Br. 15. Appellant
further argues that “Reid does not disclose administering an antioxidant to achieve a blood concentration of the antioxidant of about 1 mM.” id.

The Examiner responds, determining that the claim language “merely describes that intended result of a positively recited method step, i.e. the administration of an antioxidant compound at a particular dosage to a particular patient population and is thus not given patentable weight.” Ans. 5. The Examiner finds that Reid teaches each element claimed. In particular, Reid teaches a method of reducing oxidative modification of muscle cell proteins (e.g. myosin heavy chain) comprising administering an antioxidant (e.g. NAC [N-acetylcysteine]) in an amount sufficient to oxidative modification of proteins in a frequency of administration prior to an exercise regimen (at 172, left col., and 176, left col., first para.). The treatment is taught to reduce muscle fatigue and improve endurance, i.e. muscle performance during exercise (at 176, left col., first para.). Final Act. 2–3.

Under the principles set forth in In re Best, the burden of proof shifts to Appellant to show that the dosages of Reid (e.g., 176, col. 1) do not overlap with the claimed dosage or that Reid’s dosage does not inherently result in a blood concentration of the antioxidant of about 1 mM. Compare, In re King, 801 F.2d 1324, 1327 (Fed. Cir. 1986).

Appellant has not shown that the dosages of Reid (e.g., 176, col. 1) do not overlap with the claimed dosage or that Reid’s dosage does not inherently result in a blood concentration of the antioxidant of about 1 mM.

The anticipation rejection is affirmed for the reasons of record.
Rejection 2 — Obviousness Reid and Betters

The Examiner acknowledges that

Reid et al[.] teaches the aforementioned method, but does not teach the administration of Trolox as the particular antioxidant.

Betters et al[.] teaches that Trolox is an antioxidant compound that can reduce oxidative stress/muscle fatigue in humans (p. 1170, right column, 2nd full paragraph, and p. 1180, right column, Effects of Trolox on Contractile Properties heading).

Appellant contends that, “[n]either Reid nor Betters, alone or in combination, provide any disclosure or discussion that it would be desirable or possible to administer 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid to an individual engaged in an exercise regimen in an amount sufficient to reduce oxidative modification of one or more proteins or other cellular constituents involved in muscle cell contraction. Br. 6–7. Appellants further contend that the Examiner has engaged in hindsight reconstruction of Appellant’s invention. Br. 7.

We are not convinced by Appellant’s argument. Reid discloses that it is known in the art that, “[s]keletal muscle fibers continually generate reactive oxygen species (ROS) at a slow rate that increases during muscle contraction. This activity dependent increase in ROS production contributes to fatigue of skeletal muscle during strenuous exercise.” Reid (Abstract). Reid shows that the antioxidant, NAC, mediates muscle fatigue caused by antioxidants. Id. Reid further discloses:

Other antioxidants have not been evaluated systematically and could prove beneficial. For example, recent reports suggest endurance is augmented in rodents that receive green tea extract …, capsaicin …, or Anoectochilus formosanus … . Melatonin is reported
to alleviate perceptions of fatigue in chronic fatigue syndrome … and the herb Rhodiola rosea may have ergogenic properties ….

Reid, 176, col 2. Betters confirms the findings of Reid, concluding:

our novel results clearly demonstrate that an antioxidant, Trolox, effectively prevents MV [mechanical ventilation]-induced contractile impairments and proteolysis in the diaphragm during MV. Oxidative damage and atrophy are implicated in MV-induced contractile deficits. Oxidative damage to proteins during MV likely increases proteolytic degradation, which would contribute to diaphragmatic weakness. Trolox effectively spares the unloaded diaphragm from contractile dysfunction and protein degradation during 12 hours of controlled MV.

Betters, 1183, col. 2. Betters also discloses, “Trolox attenuated the increase in total [muscle] protein degradation induced by MV (Figure 3).” Betters, 1183, col. 2.

We agree with the Examiner’s response to Appellant’s arguments and adopt them as our own. Arguments not made are deemed waived. The obviousness rejection is affirmed for the reasons of record.

CONCLUSION OF LAW

The cited references support the Examiner’s anticipation and obviousness rejections, which are affirmed. All pending, rejected claims fall.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). See 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED