

Merck & Co., Inc. v. Ernst  
Tex.App.-Houston [14 Dist.],2008.

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AL.

Court of Appeals of Texas,Houston (14th Dist.).  
MERCK & CO., INC., Appellant

v.

Carol A. ERNST, Individually and as Personal  
Representative of the Estate of Robert Charles  
Ernst, Deceased, Appellee.

**No. 14-06-00835-CV.**

May 29, 2008.

On Appeal from the 23rd District Court, Brazoria  
County, Texas, Trial Court Cause No.  
19961\*BH02.

Katherine D. Mackillop, for Merck & Co., Inc.  
W. Mark Lanier and David W. Holman, for Carol  
A. Ernst.

Panel consists of Chief Justice HEDGES and  
Justices ANDERSON and BROWN.

## OPINION

ADELE HEDGES, Chief Justice.

\*1 Merck & Co., Inc., appeals from a jury verdict in a personal-injury and wrongful-death suit filed by Carol Ernst in which she alleged that ingestion of Vioxx caused the sudden cardiac death of her husband, Bob Ernst. Merck raises four issues in which it challenges the legal and factual sufficiency of the evidence to support the jury's verdict on causation, strict liability, negligence, malice, and damages. Merck further contends that the trial court

erred in instructing the jury and in admitting certain evidence. Finding the evidence to be legally insufficient on the issue of causation, we reverse the trial court's judgment and render judgment that appellee take nothing.

## BACKGROUND

Vioxx, known generically as rofecoxib, belongs to a general class of pain relievers known as non-steroidal anti-inflammatory drugs ("NSAIDs"). NSAIDs work by inhibiting cyclooxygenase ("COX"), an enzyme that stimulates synthesis of prostaglandins, which are chemicals produced in the body that promote certain effects. Traditional NSAIDs, such as Advil (ibuprofen), Aleve (naproxen), and Voltaren (diclofenac), have been longstanding treatment options for patients needing relief from chronic or acute inflammation and pain associated with osteoarthritis, rheumatoid arthritis, and other musculoskeletal conditions. This relief, however, has historically come with significant adverse side effects. Specifically, traditional, or non-selective, NSAIDs greatly increase the risk of gastrointestinal perforations, ulcers, and bleeds ("PUBs"). This risk is further increased when high doses are ingested, which is often necessary to remedy chronic or acute inflammation and pain.

In the early 1990s, scientists discovered that the COX enzyme had two forms-COX-1 and COX-2-each of which appeared to have several distinct functions. Scientists believed that COX-1 affected the synthesis or production of prostaglandins responsible for protection of the stomach lining, whereas COX-2 mediated the synthesis or production of prostaglandins responsible for pain and inflammation. This belief led scientists to hypothesize that "selective" NSAIDs designed to inhibit COX-2, but not COX-1, could offer the same pain relief as non-selective NSAIDs with a reduced risk of fatal or debilitating PUBs. In addition, scientists believed that such drugs might also prove beneficial

for the prevention or treatment of other conditions, such as Alzheimer's disease and certain cancers where evidence suggests that inflammation may play a causative role. In light of these scientific developments, pharmaceutical companies began developing new drugs known as "COX-2 inhibitors" or "coxibs." Merck developed a COX-2 inhibitor and named it Vioxx.

On November 23, 1998, Merck submitted a new drug application for Vioxx to the Food and Drug Administration ("FDA") and requested an expedited review of its application. Six months later, on May 20, 1999, the FDA approved Vioxx as safe and effective for treatment of osteoarthritic pain, menstrual pain, and acute pain based on the data and label supplied by Merck.

\*2 Vioxx was subjected to a number of studies and tests both before and after its initial approval. In March of 2000, Merck received the preliminary results of the Vioxx Gastrointestinal Outcomes Research ("VIGOR") study. VIGOR was an 8,000-patient trial designed to assess the relative incidence of gastrointestinal PUBs in rheumatoid arthritis patients treated with Vioxx as compared to those treated with the drug naproxen. While VIGOR demonstrated that patients taking Vioxx suffered fewer serious gastrointestinal PUBs than patients taking naproxen, it also showed that patients on Vioxx suffered a statistically significant increase of serious cardiovascular thrombotic events compared to patients taking naproxen.<sup>FN1</sup>

At the time of the VIGOR trial, two studies were being conducted on the effects of Vioxx on Alzheimer's patients. Those studies differed from the VIGOR trial in that the control group was taking a placebo, not naproxen. After receiving the VIGOR results, Merck requested that the blind controls be removed from those studies so that the scientists at Merck could investigate whether the patients who were taking Vioxx in the Alzheimer's studies experienced similar risks of cardiovascular thrombotic events. The results of both of the Alzheimer's studies revealed that patients taking

Vioxx did not suffer a greater risk for cardiovascular thrombotic events.<sup>FN2</sup>

In light of the new data obtained in the VIGOR study, Merck submitted a proposed label change for Vioxx to the FDA in June of 2000. After approximately 18 months of negotiation with Merck over the content and organization of a new Vioxx label, the FDA approved a revised label on April 11, 2002. The new label incorporated the VIGOR data and noted that such data "should be taken into consideration and caution should be exercised when Vioxx is used in patients with a medical history of ischemic heart disease."

On September 23, 2004, an external safety board monitoring the results of a separate long-term study entitled Adenomatous Polyp Prevention on Vioxx ("APPROVE"), which was designed to assess whether Vioxx could help prevent the recurrence of precancerous colon polyps, informed Merck that the interim data from this study also showed a significantly increased rate of cardiovascular events in the Vioxx arm as compared to the placebo arm of the study.<sup>FN3</sup> One week later, on September 30, 2004, Merck voluntarily withdrew Vioxx from the market.

On September 15, 2000, Dr. Brent Wallace prescribed a daily 25-milligram dose of Vioxx to Bob Ernst to alleviate tendinitis pain in Ernst's hands. On May 6, 2001, approximately one hour after Ernst went to bed, appellee noticed that he was unconscious and was having trouble breathing. Appellee called emergency medical personnel and began cardiopulmonary resuscitation ("CPR"). Ernst never regained consciousness and was pronounced dead shortly after arriving in the emergency room. An autopsy was performed the following morning, and the report listed his death as cardiac arrhythmia secondary to coronary atherosclerosis.

\*3 Appellee sued Merck alleging that the ingestion of Vioxx caused the death of her husband. Appellee's suit was tried to a jury, which found that

the design and marketing of Vioxx was defective, that Merck's negligence proximately caused Ernst's death, and that the harm to Ernst resulted from malice attributable to Merck. The jury awarded a total of \$24,450,000 in compensatory damages and assessed \$229,000,000 in exemplary damages. Pursuant to section 41.008 of the Texas Civil Practice and Remedies Code, the trial court reduced the assessment of exemplary damages and entered judgment for appellee in the sum of \$26,100,000. From that judgment, Merck appeals.

### CAUSATION

In its first issue, Merck argues that appellee failed to present legally sufficient evidence of causation. At trial, appellee alleged that Ernst's death was caused by a blood clot triggered by Vioxx. Merck first argues that appellee failed to present competent evidence of the existence of such a clot.

The test for legal sufficiency "must always be whether the evidence at trial would enable reasonable and fair-minded people to reach the verdict under review." *City of Keller v. Wilson*, 168 S.W.3d 802, 827 (Tex.2005). Legal-sufficiency review in the proper light must credit favorable evidence if reasonable jurors could, and disregard contrary evidence unless reasonable jurors could not. *Id.* Although the reviewing court must consider evidence in the light most favorable to the judgment, and indulge every reasonable inference that would support it, if the evidence permits only one inference, neither jurors nor the reviewing court may disregard it. *Id.* at 822. We sustain a legal-sufficiency challenge when the record discloses one of the following situations: (1) complete absence of evidence establishing a vital fact; (2) the court is barred by rules of law or of evidence from giving weight to the only evidence of a vital fact; (3) the evidence offered to prove a vital fact is no more than a mere scintilla; or (4) the evidence conclusively establishes the opposite of a vital fact. *Id.* at 810.

A thrombotic cardiovascular event is a myocardial

infarction or sudden cardiac death triggered by a thrombus, or blood clot. The autopsy report reflected that Ernst suffered mild to severe atherosclerosis in the left anterior artery and left circumflex coronary arteries and listed the cause of death as "cardiac arr[h]ythmia secondary to coronary atherosclerosis." Both parties' experts testified that the usual cause of a myocardial infarction is a blood clot formed in response to a rupture or fissure of atherosclerotic plaque in the inner lining of the artery. It is undisputed that no blood clot or fissure of atherosclerotic plaque was found during the autopsy.

Appellee's theory of liability is that Vioxx increases the risk of thrombotic cardiovascular events. A key component of this theory is what has become known as the Fitzgerald hypothesis, which was first posited by Garret Fitzgerald, a researcher at Merck Research Laboratories. Toward the end of 1997, Merck was studying the renal effects of Vioxx. In measuring urinary output of patients taking Vioxx, Fitzgerald found a decrease in prostaglandin metabolites, indicating the possibility of an imbalance of prostacyclin and thromboxane. Fitzgerald theorized that Vioxx creates an imbalance between thromboxane and prostacyclin in the blood vessels. Thromboxane promotes platelet aggregation, vessel constriction, and proliferation of smooth muscle cells. Prostacyclin, by contrast, opposes the action of thromboxane inhibiting platelet aggregation, facilitating vasodilation, and preventing proliferation of smooth muscle cells. In blocking COX-2, Vioxx also blocks prostacyclin; therefore, Fitzgerald hypothesized, the inhibition of COX-2 promotes an imbalance of prostacyclin and thromboxane in the blood vessels, leading to the formation of blood clots.<sup>FN4</sup> Appellee claims that this mechanism ultimately led to the formation of a blood clot in Ernst's coronary artery, causing his sudden death.

\*4 Appellee presented the testimony of three experts who testified that Vioxx caused Ernst's death. Dr. Benedict Lucchesi, a professor of pharmacology at the University of Michigan, testified as fol-

lows: He has performed extensive research on COX-2 inhibitors, including Vioxx. He testified extensively about the Fitzgerald hypothesis and the mechanism by which Vioxx can cause thrombotic cardiovascular events. Ernst "died of an arrhythmia, precipitated by a transient ischemic event leading to ventricular fibrillation." An "ischemic event" is an event that decreases the amount of oxygen delivered to the heart. Dr. Lucchesi testified that Ernst most likely died when a blood clot dissolved in the artery; he could have, however, suffered from very small clots that moved toward smaller capillaries after causing the arrhythmia. No microemboli, or small blood clots, were found during the autopsy.

Dr. Isaac Weiner, a board-certified cardiologist, testified as follows: Vioxx was a significant contributing factor in causing Ernst's death because a thrombus, or blood clot, could have formed on the underlying blockage in Ernst's arteries and blocked blood flow to the heart. Dr. Weiner opined that a blood clot might have dissolved through fibrinolysis. Vioxx does not affect the electrical impulses of the heart directly, but leads to blockages in the arteries, which cause cardiovascular events.

Dr. Maria Araneta, the assistant medical examiner who performed the autopsy, testified as follows: Ernst's left coronary arteries were 50- to 75-percent blocked by calcified plaque. She did not find a blood clot when she performed the autopsy on Ernst's body. She did not see evidence of a myocardial infarction, or heart attack, because Ernst died within an hour of initially showing symptoms. To affirmatively diagnose a myocardial infarction, the physician must observe either death of the heart muscle tissue or the presence of cardiac enzymes. To observe either death of the tissue or the presence of cardiac enzymes, the individual must have lived six to eighteen hours after suffering the myocardial infarction.<sup>FNS</sup> The most likely cause of Ernst's arrhythmia, Dr. Araneta testified, was an acute ischemic event. As the potential cause of such an event, she said, "Something blocked that artery that was already narrowed, either a clot, a fissure, block

or ruptured atheroma, none of which I saw, but it these things could be dissolved." According to Dr. Araneta, the clot could have spontaneously dissolved, been dislodged through vigorous CPR, or could have been too small to detect on autopsy. Not only did she not see a clot, but she observed no rupturing or fissuring of the atherosclerotic plaque in the coronary arteries. In fact, the plaque in Ernst's arteries was intact and so hard that the arteries had to be de-calcified before they could be sectioned for autopsy. Contrary to her report, at trial Dr. Araneta was "leaning towards more likely than not" that Ernst suffered a myocardial infarction.

\*5 Admitting that there is no direct evidence of a blood clot or myocardial infarction, appellee contends that there is sufficient circumstantial evidence to support the jury's verdict. The circumstantial evidence on which appellee relies is the testimony that a clot could have been present, but could have disappeared through various means prior to the autopsy. In claims supported by only meager circumstantial evidence, the evidence does not rise above a scintilla if jurors would have to guess whether a vital fact exists. *City of Keller*, 168 S.W.3d at 813. When the circumstances are equally consistent with either of two facts, neither fact may be inferred. *Id.* When the circumstantial evidence of a vital fact is meager, we must consider not just favorable but all the circumstantial evidence, and competing inferences as well. *Id.* at 814. Therefore, we address the circumstantial evidence that although a clot was not found, it could have disappeared.

First, Dr. Araneta opined that a clot could have naturally dissolved through a process called fibrinolysis. However, Dr. Araneta admitted that she would not expect a clot to naturally dissolve after death. Dr. Lucchesi explained that certain types of clots could naturally move through the blood vessels, but did not specify how quickly this process could take place in the body. Dr. Craig Pratt, director of the coronary care unit at Methodist Hospital and a professor of medicine at Baylor College of Medicine,

testified that the possibility of a clot dissolving on its own was not a viable hypothesis because the natural process of fibrinolysis takes 24 to 48 hours and only continues while the patient is alive. Further, clot-busting drugs, which are administered to accelerate this natural process, usually take at least an hour to dissolve a clot.

Next, Dr. Araneta and Dr. Lucchesi speculated that vigorous CPR could have dislodged a blood clot or caused it to fragment into such small pieces that it could not be detected on autopsy. Dr. Araneta testified that emboli could have been dislodged and fragmented into such small pieces that she could not have seen them on her microscope. She described this theory as a "guess," her "estimate," and a "possibility." Dr. Lucchesi admitted that he was aware of no published literature suggesting that CPR could dislodge or move clots.

An expert's bare opinion will not suffice to support a jury's verdict. *Merrell Dow Pharm. v. Havner*, 953 S.W.2d 706, 711 (Tex.1997). The substance of the testimony must be considered. *Id.* Factors to which a reviewing court should look in determining the reliability of scientific testimony are: (1) the extent to which the theory has been or can be tested; (2) the extent to which the technique relies upon the subjective interpretation of the expert; (3) whether the theory has been subjected to peer review and/or publication; (4) the technique's potential rate of error; (5) whether the underlying theory or technique has been generally accepted as valid by the relevant scientific community; (6) the nonjudicial uses that have been made of the theory or technique; and (7) any other factor that is helpful to determine the reliability of the scientific evidence. *Id.* at 714 (citing *E.I. duPont de Nemours and Co. v. Robinson*, 923 S.W.2d 549, 557 (Tex.1995)). Causation opinions based on possibility, speculation, and surmise are no evidence. *Havner*, 953 S.W.2d at 711-12. Expert opinions must be supported by facts in evidence, not conjecture. *Marathon Corp. v. Pitzner*, 106 S.W.3d 724, 729 (Tex.2003).

\*6 Dr. Araneta's and Dr. Lucchesi's opinions are

not supported by scientifically reliable facts in evidence. Appellee's experts postulate that Ernst suffered a thrombotic cardiovascular event, but at the time of his death, less than one hour later, the thrombus had been dislodged and fragmented into such small pieces that it could not be seen on a microscope. Because there is no proof that a clot existed and was dislodged, the experts' opinions are mere speculation. Moreover, we cannot disregard Dr. Thomas Wheeler's uncontroverted testimony that there is no support in scientific or medical literature for such a theory.<sup>FN6</sup> Dr. Wheeler conceded that he had neither independently learned of CPR dislodging or fragmenting a clot, nor had he read any anecdotal case reports supporting the theory. He further testified that after hearing Dr. Araneta's and Dr. Lucchesi's testimony, he researched the possibility of CPR's dislodging a clot and found no scientific or medical support for the theory. Dr. Wheeler explained that if a clot had been fragmented by CPR, the anatomy of the heart would not have permitted the fragments to travel down toward smaller capillaries, but would have pushed the fragments to a position in the coronary artery where they could have been detected.

Appellee contends that the failure to find a blood clot does not defeat causation, arguing that Dr. Lucchesi ruled out all non-thrombotic causes of Ernst's arrhythmia. Dr. Lucchesi testified that Ernst was under 65 years old, exercised regularly, had not smoked for more than 15 years, and did not have a family history of heart disease. Appellee contends that by ruling out other potential causes of sudden cardiac death, the evidence is legally sufficient to show Ernst suffered a myocardial infarction triggered by a blood clot. Dr. Lucchesi's testimony that Ernst did not exhibit risk factors for cardiovascular disease does not support the reasonable conclusion that Ernst suffered a thrombotic cardiovascular event.

Appellee points to Dr. Araneta's testimony that she rarely finds a clot on autopsy; therefore, appellee argues the failure to find a clot does not rule out the

possibility of a myocardial infarction. Dr. Araneta's testimony, however, referred to cases in which the autopsy revealed pathological evidence of myocardial infarction, *i.e.*, dead or obviously infarcted muscle tissue. Every expert agreed that Ernst died too suddenly for his heart muscle tissue to show signs of death. Moreover, the trial court excluded any evidence that ingestion of Vioxx is associated with non-thrombotic cardiovascular events because the theory was not supported by scientifically reliable evidence. The reliable expert testimony supports the theory that Vioxx causes cardiovascular events by causing blood clots, which lead to myocardial infarction or sudden cardiac death. *See Merck & Co. v. Garza*, 04-07-00234-CV 2008 WL 2037350 at \*2 (Tex.App.-San Antonio May 14, 2008, no pet. h.) (not released for publication) (recognizing expert testimony that "the formation of clots is the type of problem caused by Vioxx"). Appellee directs our attention to Dr. Araneta's and Dr. Lucchesi's opinions that "something" triggered the ischemic event suffered by Ernst. However, there is no competent evidence that a blood clot triggered by Vioxx ingestion was the "something" causing his death.

\*7 The epidemiological evidence supports the conclusion that Vioxx use at a certain dose and duration is associated with an increased risk of thrombotic cardiovascular events. The experts' speculation that a clot "could have" existed, but "could have" dissolved, been dislodged, or fragmented gives rise to nothing more than conjecture. Crediting all favorable evidence that reasonable jurors could believe and disregarding all contrary evidence except that which they could not ignore, we find no evidence that Ernst suffered a thrombotic cardiovascular event, *i.e.*, a myocardial infarction triggered by a blood clot. Accordingly, appellee failed to show that the ingestion of Vioxx caused her husband's death. Merck's first issue is sustained.FN7

The judgment of the trial court is reversed and judgment is rendered that appellee take nothing.

FN1. Claire Bombardier, et al., *Comparison of Upper Gastrointestinal Toxicity of Rofecoxib and Naproxen in Patients with Rheumatoid Arthritis*, 343 *New Eng. J. Med.* 1520 (Nov. 23, 2000).

FN2. S.A. Reines, et. al., *Rofecoxib No effect on Alzheimer's Disease in a 1-year, Randomized, Blinded, Controlled Study*, 70 *Neurology* 66 (Sept. 16, 2003); Leon J. Thal, et. al., *A Randomized, Double-Blind, Study of Rofecoxib in Patients with Mild Cognitive Impairment*, *Neuropsychopharmacology* (2005).

FN3. Robert S. Bresalier, et. al., *Cardiovascular Events Associated with Rofecoxib in a Colorectal Adenoma Chemoprevention Trial*, 352 *New Eng. J. Med.* 1092 (Mar. 17, 2005).

FN4. In 1998, Merck made the FDA advisory board aware of the Fitzgerald hypothesis. The FDA concluded that while the hypothesis was a theoretical concern, there was no evidence that it was true.

FN5. All experts agreed on this conclusion.

FN6. Dr. Wheeler is the head of pathology at Baylor College of Medicine.

FN7. Because Merck's first issue is dispositive, we need not address its remaining issues or the issues raised in appellee's cross-appeal.

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--- S.W.3d ----, 2008 WL 2201769 (Tex.App.-Hous. (14 Dist.))

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### CAUSATION

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lows: He has performed extensive research on COX-2 inhibitors, including Vioxx. He testified extensively about the Fitzgerald hypothesis and the mechanism by which Vioxx can cause thrombotic cardiovascular events. Ernst "died of an arrhythmia, precipitated by a transient ischemic event leading to ventricular fibrillation." An "ischemic event" is an event that decreases the amount of oxygen delivered to the heart. Dr. Lucchesi testified that Ernst most likely died when a blood clot dissolved in the artery; he could have, however, suffered from very small clots that moved toward smaller capillaries after causing the arrhythmia. No microemboli, or small blood clots, were found during the autopsy.

Dr. Isaac Weiner, a board-certified cardiologist, testified as follows: Vioxx was a significant contributing factor in causing Ernst's death because a thrombus, or blood clot, could have formed on the underlying blockage in Ernst's arteries and blocked blood flow to the heart. Dr. Weiner opined that a blood clot might have dissolved through fibrinolysis. Vioxx does not affect the electrical impulses of the heart directly, but leads to blockages in the arteries, which cause cardiovascular events.

Dr. Maria Araneta, the assistant medical examiner who performed the autopsy, testified as follows: Ernst's left coronary arteries were 50- to 75-percent blocked by calcified plaque. She did not find a blood clot when she performed the autopsy on Ernst's body. She did not see evidence of a myocardial infarction, or heart attack, because Ernst died within an hour of initially showing symptoms. To affirmatively diagnose a myocardial infarction, the physician must observe either death of the heart muscle tissue or the presence of cardiac enzymes. To observe either death of the tissue or the presence of cardiac enzymes, the individual must have lived six to eighteen hours after suffering the myocardial infarction.<sup>FNS</sup> The most likely cause of Ernst's arrhythmia, Dr. Araneta testified, was an acute ischemic event. As the potential cause of such an event, she said, "Something blocked that artery that was already narrowed, either a clot, a fissure, block

or ruptured atheroma, none of which I saw, but it these things could be dissolved." According to Dr. Araneta, the clot could have spontaneously dissolved, been dislodged through vigorous CPR, or could have been too small to detect on autopsy. Not only did she not see a clot, but she observed no rupturing or fissuring of the atherosclerotic plaque in the coronary arteries. In fact, the plaque in Ernst's arteries was intact and so hard that the arteries had to be de-calcified before they could be sectioned for autopsy. Contrary to her report, at trial Dr. Araneta was "leaning towards more likely than not" that Ernst suffered a myocardial infarction.

\*5 Admitting that there is no direct evidence of a blood clot or myocardial infarction, appellee contends that there is sufficient circumstantial evidence to support the jury's verdict. The circumstantial evidence on which appellee relies is the testimony that a clot could have been present, but could have disappeared through various means prior to the autopsy. In claims supported by only meager circumstantial evidence, the evidence does not rise above a scintilla if jurors would have to guess whether a vital fact exists. *City of Keller*, 168 S.W.3d at 813. When the circumstances are equally consistent with either of two facts, neither fact may be inferred. *Id.* When the circumstantial evidence of a vital fact is meager, we must consider not just favorable but all the circumstantial evidence, and competing inferences as well. *Id.* at 814. Therefore, we address the circumstantial evidence that although a clot was not found, it could have disappeared.

First, Dr. Araneta opined that a clot could have naturally dissolved through a process called fibrinolysis. However, Dr. Araneta admitted that she would not expect a clot to naturally dissolve after death. Dr. Lucchesi explained that certain types of clots could naturally move through the blood vessels, but did not specify how quickly this process could take place in the body. Dr. Craig Pratt, director of the coronary care unit at Methodist Hospital and a professor of medicine at Baylor College of Medicine,

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testified that the possibility of a clot dissolving on its own was not a viable hypothesis because the natural process of fibrinolysis takes 24 to 48 hours and only continues while the patient is alive. Further, clot-busting drugs, which are administered to accelerate this natural process, usually take at least an hour to dissolve a clot.

Next, Dr. Araneta and Dr. Lucchesi speculated that vigorous CPR could have dislodged a blood clot or caused it to fragment into such small pieces that it could not be detected on autopsy. Dr. Araneta testified that emboli could have been dislodged and fragmented into such small pieces that she could not have seen them on her microscope. She described this theory as a "guess," her "estimate," and a "possibility." Dr. Lucchesi admitted that he was aware of no published literature suggesting that CPR could dislodge or move clots.

An expert's bare opinion will not suffice to support a jury's verdict. *Merrell Dow Pharm. v. Havner*, 953 S.W.2d 706, 711 (Tex.1997). The substance of the testimony must be considered. *Id.* Factors to which a reviewing court should look in determining the reliability of scientific testimony are: (1) the extent to which the theory has been or can be tested; (2) the extent to which the technique relies upon the subjective interpretation of the expert; (3) whether the theory has been subjected to peer review and/or publication; (4) the technique's potential rate of error; (5) whether the underlying theory or technique has been generally accepted as valid by the relevant scientific community; (6) the nonjudicial uses that have been made of the theory or technique; and (7) any other factor that is helpful to determine the reliability of the scientific evidence. *Id.* at 714 (citing *E.I. duPont de Nemours and Co. v. Robinson*, 923 S.W.2d 549, 557 (Tex.1995)). Causation opinions based on possibility, speculation, and surmise are no evidence. *Havner*, 953 S.W.2d at 711-12. Expert opinions must be supported by facts in evidence, not conjecture. *Marathon Corp. v. Pitzner*, 106 S.W.3d 724, 729 (Tex.2003).

\*6 Dr. Araneta's and Dr. Lucchesi's opinions are

not supported by scientifically reliable facts in evidence. Appellee's experts postulate that Ernst suffered a thrombotic cardiovascular event, but at the time of his death, less than one hour later, the thrombus had been dislodged and fragmented into such small pieces that it could not be seen on a microscope. Because there is no proof that a clot existed and was dislodged, the experts' opinions are mere speculation. Moreover, we cannot disregard Dr. Thomas Wheeler's uncontroverted testimony that there is no support in scientific or medical literature for such a theory.<sup>FN6</sup> Dr. Wheeler conceded that he had neither independently learned of CPR dislodging or fragmenting a clot, nor had he read any anecdotal case reports supporting the theory. He further testified that after hearing Dr. Araneta's and Dr. Lucchesi's testimony, he researched the possibility of CPR's dislodging a clot and found no scientific or medical support for the theory. Dr. Wheeler explained that if a clot had been fragmented by CPR, the anatomy of the heart would not have permitted the fragments to travel down toward smaller capillaries, but would have pushed the fragments to a position in the coronary artery where they could have been detected.

Appellee contends that the failure to find a blood clot does not defeat causation, arguing that Dr. Lucchesi ruled out all non-thrombotic causes of Ernst's arrhythmia. Dr. Lucchesi testified that Ernst was under 65 years old, exercised regularly, had not smoked for more than 15 years, and did not have a family history of heart disease. Appellee contends that by ruling out other potential causes of sudden cardiac death, the evidence is legally sufficient to show Ernst suffered a myocardial infarction triggered by a blood clot. Dr. Lucchesi's testimony that Ernst did not exhibit risk factors for cardiovascular disease does not support the reasonable conclusion that Ernst suffered a thrombotic cardiovascular event.

Appellee points to Dr. Araneta's testimony that she rarely finds a clot on autopsy; therefore, appellee argues the failure to find a clot does not rule out the

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possibility of a myocardial infarction. Dr. Araneta's testimony, however, referred to cases in which the autopsy revealed pathological evidence of myocardial infarction, *i.e.*, dead or obviously infarcted muscle tissue. Every expert agreed that Ernst died too suddenly for his heart muscle tissue to show signs of death. Moreover, the trial court excluded any evidence that ingestion of Vioxx is associated with non-thrombotic cardiovascular events because the theory was not supported by scientifically reliable evidence. The reliable expert testimony supports the theory that Vioxx causes cardiovascular events by causing blood clots, which lead to myocardial infarction or sudden cardiac death. *See Merck & Co. v. Garza*, 04-07-00234-CV 2008 WL 2037350 at \*2 (Tex.App.-San Antonio May 14, 2008, no pet. h.) (not released for publication) (recognizing expert testimony that "the formation of clots is the type of problem caused by Vioxx"). Appellee directs our attention to Dr. Araneta's and Dr. Lucchesi's opinions that "something" triggered the ischemic event suffered by Ernst. However, there is no competent evidence that a blood clot triggered by Vioxx ingestion was the "something" causing his death.

\*7 The epidemiological evidence supports the conclusion that Vioxx use at a certain dose and duration is associated with an increased risk of thrombotic cardiovascular events. The experts' speculation that a clot "could have" existed, but "could have" dissolved, been dislodged, or fragmented gives rise to nothing more than conjecture. Crediting all favorable evidence that reasonable jurors could believe and disregarding all contrary evidence except that which they could not ignore, we find no evidence that Ernst suffered a thrombotic cardiovascular event, *i.e.*, a myocardial infarction triggered by a blood clot. Accordingly, appellee failed to show that the ingestion of Vioxx caused her husband's death. Merck's first issue is sustained. FN7

The judgment of the trial court is reversed and judgment is rendered that appellee take nothing.

FN1. Claire Bombardier, et al., *Comparison of Upper Gastrointestinal Toxicity of Rofecoxib and Naproxen in Patients with Rheumatoid Arthritis*, 343 *New Eng. J. Med.* 1520 (Nov. 23, 2000).

FN2. S.A. Reines, et. al., *Rofecoxib No effect on Alzheimer's Disease in a 1-year, Randomized, Blinded, Controlled Study*, 70 *Neurology* 66 (Sept. 16, 2003); Leon J. Thal, et. al., *A Randomized, Double-Blind, Study of Rofecoxib in Patients with Mild Cognitive Impairment*, *Neuropsychopharmacology* (2005).

FN3. Robert S. Bresalier, et. al., *Cardiovascular Events Associated with Rofecoxib in a Colorectal Adenoma Chemoprevention Trial*, 352 *New Eng. J. Med.* 1092 (Mar. 17, 2005).

FN4. In 1998, Merck made the FDA advisory board aware of the Fitzgerald hypothesis. The FDA concluded that while the hypothesis was a theoretical concern, there was no evidence that it was true.

FN5. All experts agreed on this conclusion.

FN6. Dr. Wheeler is the head of pathology at Baylor College of Medicine.

FN7. Because Merck's first issue is dispositive, we need not address its remaining issues or the issues raised in appellee's cross-appeal.

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