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The May issue of *Nature Immunology* contains a "Commentary" essay on the role that evolutionary immunology played in the now-famous cross-examination of Michael Behe on Day 12 of the *Kitzmiller v. Dover* trial in the fall of 2005. The essay is available at the *Nature Immunology* website, although a subscription or fee is currently required. The Supplementary Material for the article, a bibliography of the evolutionary immunology publications used during the trial, is available for free in NCSE's online *Kitzmiller* archive.

The essay is coauthored by [Nick Matzke](#) [4] **[Link broken]**, NCSE Public Information Project Director and a key behind-the-scenes player in the [Kitzmiller case](#) [5]. NCSE consulted pro bono for the plaintiffs' legal team in *Kitzmiller*, and Matzke worked almost full-time with the legal team for a year before the trial, advising the lawyers on creationist/intelligent design arguments, the relevant science, and the history of creationism. He then attended all six weeks of the trial, where he continued this work. Matzke worked with Pepper-Hamilton attorney [Eric Rothschild](#) [6] during Rothschild's preparation for the cross-examination of Behe, and he assembled the exhibit of articles, books, and book chapters on the evolution of the immune system that was stacked up on Behe's podium during cross. Behe dismissed the stack of literature, despite his previous claims that the scientific literature had "no answers" on the evolutionary origin of the immune system. This episode was cited in many news accounts as a high point during the Behe cross, and it was cited by Judge John Jones III on pages 77-79 of his December 20, 2005 ruling.

Matzke teamed up with two immunologists to write the article: [Andrea Bottaro](#) [7] (Department of Medicine, Department of Microbiology and Immunology and the James P. Wilmot Cancer Center, University of Rochester School of Medicine and Dentistry) and [Matt Inlay](#) [8] (Department of Pathology, Beckman Center, Stanford University). Both are contributors to the [Panda's Thumb weblog](#) [9], and have written detailed critiques of Behe's claims about immunology ([Bottaro](#) [10], [Inlay](#) [8]). These critiques served as an inspiration and guide for Matzke during preparation of the immune system section of the

Behe cross-examination.

The *Nature Immunology* commentary reviews the background of the case, the science supporting the transposon model for the evolutionary origin of the adaptive immune system's rearranging antibodies, the problems with Behe's claims about the system, and recounts this dramatic episode of the Behe cross-examination. The article concludes,

During cross-examination by the plaintiffs' lead counsel Eric Rothschild, Behe reiterated his claim about the scientific literature on the evolution of the immune system, testifying that "the scientific literature has no detailed testable answers on how the immune system could have arisen by random mutation and natural selection." Rothschild then presented Behe with a thick file of publications on immune system evolution, dating from 1971 to 2006, plus several books and textbook chapters. Asked for his response, Behe admitted he had not read many of the publications presented (a small fraction of all the literature on evolutionary immunology of the past 35 years), but summarily rejected them as unsatisfactory and dismissed the idea of doing research on the topic as "unfruitful."

This exchange clearly made an impression on Judge Jones, who specifically described it in his opinion:

In fact, on cross-examination, Professor Behe was questioned concerning his 1996 claim that science would never find an evolutionary explanation for the immune system. He was presented with fifty-eight peer-reviewed publications, nine books, and several immunology textbook chapters about the evolution of the immune system; however, he simply insisted that this was still not sufficient evidence of evolution, and that it was not 'good enough.'

We find that such evidence demonstrates that the ID argument is dependent upon setting a scientifically unreasonable burden of proof for the theory of evolution.

Other important scientific points stood out during trial relating to other purported irreducibly complex systems such as the flagellum and the clotting cascade, the nature of science itself and the lack of experimental tests and supporting peer-reviewed publications for ID. But the stark contrast between the lively and productive field of evolutionary immunology and the stubborn refusal by ID advocates such as Behe to even consider the evidence was undoubtedly crucial in convincing the judge that the ID movement has little to do with science. As Rothschild remarked in his closing argument,

Thankfully, there are scientists who do search for answers to the question of the origin of the immune system. It's the immune system. It's our defense against debilitating and fatal diseases. The scientists who wrote those books and articles toil in obscurity, without book royalties or speaking engagements. Their efforts help us combat and cure serious medical conditions. By contrast, Professor Behe and the entire intelligent design movement are doing nothing to advance scientific or medical knowledge and are telling future generations of scientists, don't bother.

Evolutionary immunologists should be pleasantly surprised by and proud of the effect their scientific accomplishments have had in this landmark judicial case. This commentary is meant to acknowledge their contribution on behalf of the Dover families, their lawyers and all the activists for rigorous science education who have participated in these proceedings. Most importantly, however, the Dover case shows that no scientific field is too remote from the hotly debated topics of the day and that no community is too small and removed from the great urban and scientific centers to be relevant. Immunologists must engage their communities and society at large in events related to public perceptions about science. Now more than ever, the participation of scientists is essential for the crafting of rational policies on scientific research and science education.

The online [Supplementary Material](#) [11] links to two webpages by Matzke giving more background of the science of evolutionary immunology and its relevance to Behe's claims. See the [Annotated Bibliography on the Evolutionary Origin of the Vertebrate Immune System](#) [12] and the [Longer, Unannotated Bibliography on the Evolutionary Origin of the Immune System](#) [13].

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