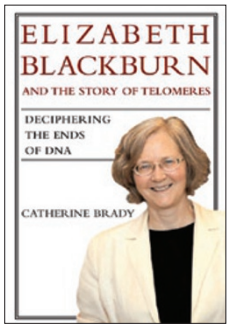
The beginning of the ends



Elizabeth Blackburn and the Story of Telomeres

By Catherine Brady

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Reviewed by Susan L Forsburg

The study of telomeres, the specialized structures at the ends of chromosomes, started with a few aficionados working in unusual model organisms and exploded into a major research area with broad significance to human cancer and aging. This highly readable book profiles prize-winning molecular biologist Elizabeth Blackburn and details her seminal contributions to telomere biology. Author Catherine Brady traces Blackburn's journey from her childhood in Tasmania to her university education in Melbourne, PhD at Cambridge, postdoc at Yale and finally, to her faculty positions at the University of California campuses at Berkeley and San Francisco. Along the way, Brady tells the parallel story of telomeres—from the painstaking sequencing methods used to identify telomeric repeats, to the isolation of the unusual telomerase enzyme and the advances into human biology. Any biography of Blackburn is of necessity a biography of telomeres, and this structure works very well.

The young Blackburn clearly demonstrates the same traits as the mature scientist: careful, intensely focused on the work, and stubborn yet always polite, with an external serenity and grace under pressure. Her intellectual rigor and personal integrity are apparent early. As the story unfolds, Brady illustrates Blackburn's tendency to hide in her science, which Blackburn herself describes as part of a strategy "'to try to fit in, which I decided unconsciously, meant keeping my head down and trying not to make waves.'" Yet within her research, Blackburn was making waves, as the unusual biology of telomeres demanded paradigm shifts in our understanding of the mechanisms that replicate DNA. Driven by data, Blackburn is able to "[shift] gears from a patient cautious stance to a bold one that synthesizes information in unexpected ways," essential to one who is participating in the birth of a new field. However, her boldness is not abrasive: notable throughout this book is the affection felt towards Blackburn, which is apparent in Brady's interviews of numerous colleagues and former students. Blackburn is widely known a genuinely nice person, refreshingly free of arrogance, and Brady describes her as "remarkably openhanded both personally and intellectually."

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A subtext is how Blackburn's experiences were shaped by being a woman and a mother as well as a remarkably talented scientist. From deflecting an early question ("'What's a nice girl like you doing in science?'") to managing the hectic schedule of juggling day care and a demanding administrative schedule, all the while doing world class research, Blackburn's experience also show how a generation of women worked to succeed. Due credit is given to Blackburn's postdoctoral mentor Joe Gall, who famously helped develop the careers of several remarkable woman scientists at a time when women in research labs were still the exception. Now, Blackburn herself has become a leading voice for the inclusion of women at all levels of science.

Like many scientists, Blackburn's passion is for research, and it is clear that administrative responsibilities are more burden than pleasure. Blackburn is not one to 'play the game' of academic politics and is disadvantaged by being a woman who lacks the rulebook of an intensely male world. Thus, her tenure as a department chair at UCSF is described as challenging, requiring her to learn on the job to speak the alien language of Deans and business officers. However, her credibility as a scientist gave her an important voice in the community, and she followed this with a leadership role at the American Society for Cell Biology.

This increasing leadership profile brought Blackburn to another form of prominence: in 2001, she was asked to serve on President Bush's newly formed Council on Bioethics. Blackburn was one of a few scientists on the panel, which was formed to examine stem cell research, among other issues. In several riveting chapters, Brady describes the intense politics of the council, the manipulation and misstatement of scientific facts, and the antipathy to basic research that characterized its reports. Noting that "debate founders when evidence is treated as if it were as malleable as opinion," Brady depicts the ongoing but ultimately unsuccessful efforts of Blackburn and her fellow scientists to have a dispassionate and fact-based discussion of the issues, free from political agenda. The biased committee reports were widely decried in the scientific community. Contrasting scientists and politicians, Brady explains that "for scientists, contesting the accuracy of evidence and revising belief in the light of fact is a professional obligation, ideologically neutral, and thus they are unlikely to anticipate the fallout that results when they do not concede defeat." Blackburn's defeat led to her removal from the committee, and her dismissal became a symbol of the inappropriate politicization and misrepresentation of science under President Bush's administration.

Overall, Catherine Brady's book is well researched and well written. There are a few weaknesses; some of the illustrations for telomere biology are unsatisfactory and appear too late for essential concepts. The final chapter is an overview of ongoing work in Blackburn's laboratory that feels tacked on. However, the strengths of the biography are not only the appealing central character of Blackburn herself, but also the excitement Brady conveys about the research, the subtext about women in science, and the conflict between science and politics. This makes for an engaging book with a compelling sense of how Nobel-caliber research should be done.