

OAS 2004 Oklahoma Scientist of the Year

Doris M. Benbrook, Ph.D. earned her Bachelors degree from North Central College in Naperville, Illinois with a double major in Biology and Chemistry and a minor in German. Her Ph.D. thesis was completed at Loyola University in Illinois where she delineated how a quinolone antibiotic called Norfloxacin bound DNA Gyrase to kill *Pseudomonas aeruginosa*, an opportunistic pathogen that infects the lungs of children with cystic fibrosis. She demonstrated that Norfloxacin kills bacteria at low concentrations by inhibiting DNA replication while allowing RNA synthesis to continue causing the cells to elongate and explode, however at higher concentrations both DNA and RNA synthesis are inhibited allowing the cells to survive until the drug is removed. These findings demonstrate the importance of controlling drug concentrations in patients in order to be effective. In her Postdoctoral Fellowship conducted at the La Jolla Cancer Research Foundation (now called the Burnham Institute) in California, she cloned and characterized the nuclear receptors for retinoic acid, thyroid hormone and cholesterol. This was a major step forward in understanding how these molecules regulate cellular activity. As a Research Fellow at the Imperial Cancer Research Fund (ICRF) in London, she demonstrated how transcription factors from different cellular signal transduction pathways interacted. These pathways were previously thought to be separate and her findings demonstrated that an interacting network was mediating the effects of growth factors on cells. Since she joined the Faculty in the Department of Obstetrics and Gynecology at the University of Oklahoma Health Sciences Center (OUHSC) in 1991, she rose through the ranks to become a Full Tenured Professor, Vice-Chair of the Institutional Biosafety Committee and Co-Director of the Gynecologic Oncology Program of the OU Cancer Center. She serves on multiple Na-

tional and International Committees developing and reviewing basic science and clinical protocols for cancer prevention, diagnosis and treatment. She is chair of the Cancer Epidemiology, Prevention



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and Control Subcommittee of the National Cancer Institute (NCI). In her current research, she developed 3-dimensional organotypic models to study how normal cells become cancer cells and developed drugs to inhibit this process and kill cancer cells. These drugs were synthesized by K. Darrell Berlin, Ph.D., a Chemist at Oklahoma State University. She successfully competed to have their lead compound, SHetA2, evaluated for pharmacokinetics, toxicity and formulation in the NCI's Rapid Access to Intervention Development (RAID) program funded by over 2 million dollars. This testing will provide the information needed to apply to the Food and Drug Administration (FDA) for approval to initiate clinical trials. She is also an Adjunct Professor in the Department of Biochemistry and Molecular Biology at OUHSC where she teaches and mentors Graduate Students. Her teaching and mentoring of scientific research spans from Grade School Students to Junior Faculty and includes scientists and clinicians. Her community involvement includes serving on her Neighborhood Association Council, Boy Scouts and Girl Scouts, local lectures and Science Fair judging. She is married to Jeffrey P. Benbrook and they have a son, Zebulun, who is in 8th grade at Classen School of Advanced Studies and a daughter, Katlyn, who is in 3rd grade at Wilson Arts Integration School.