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**i**  
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**Atlanta, GA USA**

**TESI DOCTORAL**

**Anti-microtubule drugs: Mechanisms of Action and Resistance**  
*Agents anti-microtubulars: Mecanismes d'Acció i Resistència*

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En Mariano Monzó Planella, Professor Associat i Director del Departament d'Anatomia i Embriologia Humana de la Facultat de Medicina de la Universitat de Barcelona

CERTIFICA:

Que la Tesi Doctoral titulada: "**Anti-microtubule drugs: Mechanisms of Action and Resistance** *Agents anti-microtubulars: Mecanismes d'Acció i Resistència*", ha estat realitzada per na Aurora O'Brate Grupp sota la seva direcció, i és apta per a ser presentada davant del Tribunal i optar al grau de Doctor.

Dr. Mariano Monzó Planella

Barcelona, Juny de 2005

**To courageous Kim Fuller,**  
November 29, 2003



**To my precious daughter and my wonderful husband.**

**To my giving brother and loving sister.**

**To our faithful Suki, Mister B, Socrates and Sunny.**

**To my supporting Mommy and her supporting Lyn.**

**To my encouraging Daddy and Gemma, Anna, Bernat, Maria, Ling Ling, Ramon, Joel, Marti.**

**To Grandma and Grandpa Sunshine, for being more than grandparents should be.**

**To Grandpa Larry and Grandma Beth, for being great grandparents.**

**To my unique caring “American” family: Phil and Sue, Kris and Ben, Noah and Lydia, Barb and Dan, Carey and Steve and Heidi.**

**To protective Mariano Monzó, who believed in me.**

**To friends Evi and Dimitris, and now Emma, who taught me all I know and more.**

**To brilliant Rafael Rosell, who has always provided for me.**

**To Pilar, Ura, Xenia, Isabel, Gemma, Anna, Marta, Freia; for good friends are always there for you.**

**To Dani, Erik, Adam, Shala, Yuefang and Andy; for the crazy tough times.**

**To Dani, Fabi and Milu; for all the laughter.**

**To Barbara, Imma, Laura, Eva; for we are all Mothers now!!**

## *Excerpt from Dimensions of Cancer*

Somewhere, in what had been up until then a near perfectly harmonious community of some one hundred trillion cells, a normal cell becomes a cancer cell.

There is no sharp jab of pain to mark the event. There is no "festering" at the site of the transformation. There is no rallying of the immune system.

The body accepts the cell as if it were one of its own (which it is), still under the control of the collective whole (which it is not).

For a long time, maybe twenty or thirty years, the cancer cell divides again and again. Even when its descendants number in the billions, the body exhibits no readily apparent sign or symptom of what has by then become a semi-independent mass with its own blood supply. By this time some tiny "gangs" of cancer cells have broken away from the original mass and have started thriving colonies in the brain and in the lungs, places to which the "colonists" were carried by the blood stream.

About the time the original mass reaches the ten-billion cell size, the body notices a lump.

There is a hasty visit to the doctor.

An anesthesiologist puts the body to sleep, and a surgeon cuts a small piece of the tumor off and gives it to a pathologist, who looks at it under a microscope and says the tumor is malignant. An examination of adjacent lymph nodes, chest X-rays, and brain scans indicate that the cancer has spread; the case is declared "advanced." The surgeon tells the family that not all the cancer was removed. A medical oncologist is called in. There are regular trips to the outpatient clinic, but in this case, the body dies.

Death comes only after a long period in which the victim slowly and progressively deteriorates. When it is finally over, the survivors are glad; some had even prayed for an early end, and now some of them feel guilty. There are large medical bills to be paid.

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