Dr. O'Brien had handed Judy a pamphlet on melanoma before he left the room. As she started reading it, Judy realized that this is what they were going to test her for. Melanoma is a type of skin cancer that starts in your melanocyte cells, or the pigment cells of your skin. Actually, a mole is just a clump of melanocytes. There were pictures of cancerous moles in the pamphlet and one of them looked a little like hers, only bigger. She was starting to get worried. Below is part of what she saw:

Image courtesy of Arthur C Huntley MD, University of California Davis
http://www.mpip.org/guide/suspindex.html

Dr. O'Brien returned just then and apologized for the disruption. "Do you have any more questions?"

“Well, I just don't understand how it's possible for a 20-year-old to get cancer. Isn't cancer an old person's disease?"

“You're right that most cancer patients are older. That's because you accumulate mutations in your genes over time. UV light, cigarette smoke, other chemicals, and even aging itself can cause mutations in genes. The kind of cancer that we're checking your mole for is melanoma. This is the most common cancer in people aged 25 to 29 and is the fastest-growing category of cancer, increasing four percent each year. You are a bit young, but you may be genetically predisposed to melanoma."

“What does that mean?” Judy asked.
"Well, remember the cell cycle genes that we were talking about earlier? I described the proto-oncogenes as being needed for activating cell division. Well, remember that I also mentioned a class of cell cycle genes that prevent cell division. These genes are called tumor suppressors. You usually have two good copies of each of these tumor suppressor genes, but sometimes you inherit one good copy and one mutated copy. Basically it means that, along with inheriting genes for your red hair or blue eyes, you may have inherited a mutated cell cycle gene. You had it when you were born, so it's not the result of lying in the sun too much or anything like that. But for these types of genes to lead to cancer, you need to have both copies of the gene mutated. One good copy is sufficient to prevent your cells from dividing aberrantly. So you can be born with one mutated copy, but not actually get cancer unless the other copy accidentally gets mutated sometime during your life. Mutations in the second copy could be the result of UV light from the sun, like in the case of melanoma. Since you may have been born with one mutated copy already, you are "predisposed" to getting cancer. You are one step closer to getting cancer compared to someone who doesn't have a mutation. We see a genetic, or hereditary, component in about five to 10 percent of melanoma cases. Do you know if anyone in your family has had melanoma?"

Judy shook her head, "I'm pretty sure that my dad hasn't, but my parents split up when I was young and I haven't really talked to my mom in the last 10 years. I thought I heard that she had some mole thing removed a long time ago, but I didn't think that it was cancer."

The doctor said, "You might want to call her. Now, let's get this biopsy done and hopefully prove that all this talk about cancer is unnecessary."

**Questions:**

1. Now that you know a little more, what are the risk factors that increase a person's chances of having melanoma?
2. How does sunlight contribute to the development of melanoma?
3. What does it mean to be predisposed to getting cancer? If you inherit a mutated cell cycle gene, does that automatically mean that you will get cancer some day? If you inherit a mutated cell cycle gene and participate in risky behaviors such as sunbathing, does that mean that you will automatically get cancer some day?