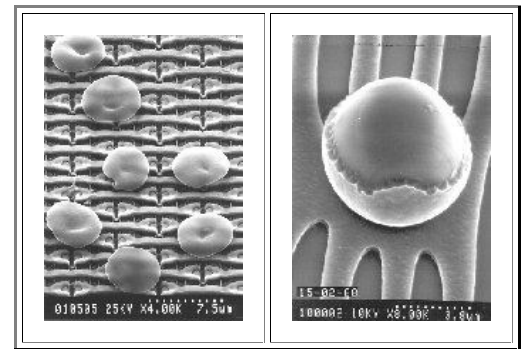


### 5.3.2 Summary to: 5.3 Cleanrooms, Particles and Contamination

▶ Dirt in any form - as "particles" on the surface of wafer, or as "contamination" inside the wafer is almost always deadly

- Particles with sized not much smaller than minimum feature sizes (i.e. < **10 nm** in **2007**) will invariably cover structures and lead to local dysfunction of a transistor or whatever.
- Point defects like metal atoms in the **Si** lattice may precipitate and cause local short circuits etc. from the "inside", killing transistors
- One dysfunctional transistor out of **1.000.000.000** or so is enough to kill a chip!



▶ Being extremely clean is absolutely mandatory for high Yields **Y!**

- Use cleanrooms and hyper-clean materials!
- It won't be cheap!