3.4-3.5

- I. Introduction
 - a. Business.
 - i. The pharmaceutical industry will probably conquer the nano market first.
 - ii. Because people are always sick, the growth potential is enormous.
 - b. Application
 - i. Nanoparticles are so small, they can are undetected by phagocytes
 - 1. They can enter the bloodstream with ease.
 - They have the potential to stay there indefinitely.
 a. Coatings could be applied to achieve this.
 - ii. They have the potential to revolutionize how the following diseases are treated.
 - 1. Cancer
 - 2. Brain disease.
 - iii. They are also valuable for diagnosing disease.
 - 1. They are important for medical imaging.
- II. How they work
 - a. Administration
 - i. Because nanoparticles could potentially "target" areas of the body, dosages for almost any drug could be reduced to 2% of the current dose, by placing drugs in these targeting particles.
 - b. Absorption
 - i. Because nanoparticles are undetected by phagocytes, they can enter the body anywhere.
 - ii. They can even venture inside blood cells and be ferried throughout the body.
 - c. Excretion
 - i. Our organs will most likely excrete these particles.
 - 1. Possible if they are coated with foreign proteins.
 - ii. There is a possibility that these particles will not leave if these proteins are not present.
 - iii. Actual risks have not been determined.
 - d. The brain
 - i. Nanoparticles cross the blood-brain barrier.
 - 1. This could be potentially harmful if the particles are not intended for the brain.
 - 2. The possibility to make smaller doses of drugs for the brain exists.
 - a. 98% of drugs directed at the brain never get there

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- i. Often these drugs have unpleasant side effects associated with them
- b. Minimizing these drugs would reduce/ eliminate side effects.
- III. Enzymes are believed to function like a lock and key.
 - a. Nanoparticles could disrupt undesirable enzyme activity.
 - i. Inhibiting enzymes that promote AIDS would be a valuable way to treat the disease.
 - ii. Enzymes responsible for allergies could be turned off.
 - iii. This could potentially help people lose weight by manipulating metabolic processes.
- IV. Research
 - a. Steps are being taken to reduce/ eliminate the environmental risks of nanoparticles.