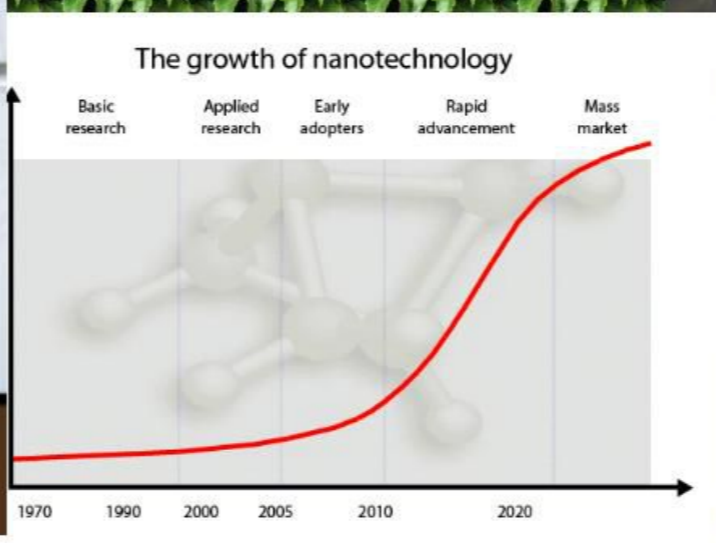




Unseen Hazards

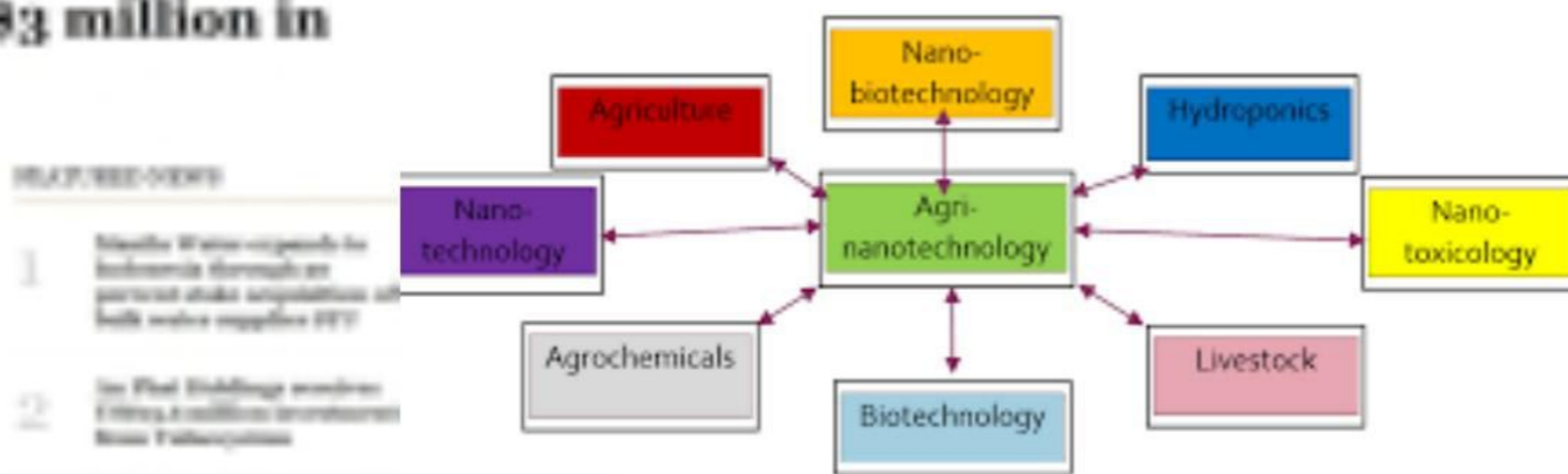
from Nanotechnology to Nanotoxicity

Completely Unregulated



Singapore's Sirius Venture invests US\$3 million in Israeli food tech startup SuperMeat

NANOFOODS
\$ 40 Billion Business



Why should you know something about Nanotechnology?

The National Science Foundation estimates that by the year 2015 there will be a need for **2 million workers** worldwide in the fields of nanoscience and nanotechnology.

An additional **5 million workers** will be needed in support areas for these fields.

By 2015, nanotechnology is expected to be a **\$3 trillion industry**

Agriculture	Food Processing	Food Packaging	Supplements
<ul style="list-style-type: none"> Single molecule detection to determine enzyme/substrate interactions Nanocapsules for delivery of pesticides, fertilizers and other agrichemicals more efficiently Delivery of growth hormones in a controlled fashion Nanosensors for monitoring soil conditions and crop growth Nanochips for identity preservation and tracking Nanosensors for detection of animal and plant pathogens Nanocapsules to deliver vaccines Nanoparticles to deliver DNA to plants (targeted genetic engineering) 	<ul style="list-style-type: none"> Nanocapsules to improve bioavailability of nutraceuticals in standard ingredients such as cooking oils Nanoencapsulated flavor enhancers Nanotubes and nanoparticles as gelation and viscifying agents Nanocapsule infusion of plant based steroids to replace a meat's cholesterol Nanoparticles to selectively bind and remove chemicals or pathogens from food Nanoemulsions and -particles for better availability and dispersion of nutrients 	<ul style="list-style-type: none"> Antibodies attached to fluorescent nanoparticles to detect chemicals or foodborne pathogens Biodegradable nanosensors for temperature, moisture and time monitoring Nanoclays and nanofilms as barrier materials to prevent spoilage and prevent oxygen absorption Electrochemical nanosensors to detect ethylene Antimicrobial and antifungal surface coatings with nanoparticles (silver, magnesium, zinc) Lighter, stronger and more heat-resistant films with silicate nanoparticles Modified permeation behavior of foils 	<ul style="list-style-type: none"> Nanosize powders to increase absorption of nutrients Cellulose nanocrystal composites as drug carrier Nanoencapsulation of nutraceuticals for better absorption, better stability or targeted delivery Nanococheates (coiled nanoparticles) to deliver nutrients more efficiently to cells without affecting color or taste of food Vitamin sprays dispersing active molecules into nanodroplets for better absorption