

**Nanoparticles are in baby formula**

Friends of the Earth commissioned independent laboratory analysis of popular baby formulas to find out if they contain nanoparticles. There is little information available for consumers to learn about where these ingredients are used in products and what the risks might be. We found engineered nano-ingredients in all six baby formulas we tested.

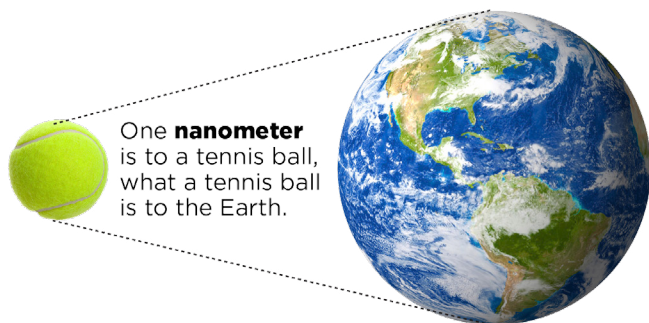
**Results summary:**

Baby Formula Brand	Nanoparticles Found
Gerber® Good Start® Gentle	Nano-hydroxyapatite (nano HA)
Gerber® Good Start® Soothe	Titanium dioxide and silicon dioxide (limited amount of particles detected)
Enfamil™	Nano-hydroxyapatite (nano HA) in needle-like and non needle-like form
Similac® Advance® OptiGRO™ (liquid)	Titanium dioxide (nano TiO2 laboratory results inconclusive)
Similac® Advance® OptiGRO™ (powder)	Nano silicon dioxide (laboratory results inconclusive)
Well Beginnings™ Advantage®	Nano-hydroxyapatite (nano HA)

**What are nanomaterials?**

The word nanomaterial is an umbrella term for infinitesimally small substances with one or more dimensions (length, width or height) or surface structures on the nano-scale. The nano-scale is the range from 1 - 500 nanometers, with one nanometer being one millionth of a millimeter. The term nanomaterial includes nanoparticles as well as aggregates and agglomerates (clumps) of nanoparticles.

To put the nano-scale in context: a strand of DNA is 2.5 nm wide, a red blood cell is 7,000 nm wide, and a human hair is around 80,000 nm wide.



The properties of matter change at the nano-scale, as the laws of classical physics give way to quantum effects. The properties of nanomaterials can therefore be quite different from those of larger particles of the same substance. Altered properties can include color, solubility, material strength, electrical conductivity and magnetic behavior. Nanomaterials also have a greater surface area relative to volume. This makes them much more chemically reactive than larger particles.

**What are the health concerns?**

We have known for at least a decade that there are health risks associated with nanomaterials. Friends of the Earth is especially concerned about the nano-hydroxyapatite in needle form found in the Gerber, Enfamil, and Well Beginnings formula. The European Union Scientific Committee on Consumer Safety (SCCS) found that needle nano-hydroxyapatite is potentially toxic, could be absorbed by and enter cells and should not be used in cosmetics such as toothpaste, teeth whiteners and mouth washes. A material that should not be used in cosmetics raises greater concern when used in food.

Nanoparticles pose new risks because:

- They can be more chemically reactive and more bioactive than larger particles of the same chemicals.
- Due to their very small size, nanoparticles have been demonstrated to be more likely than larger particles to enter cells, tissues and organs.
- Greater bioavailability and greater bioactivity may introduce new toxicity risks.

[Read the full report for additional health concerns and scientific data](#)

**Are these nano-ingredients labeled?**

Companies are not required to inform consumers about their use of nanoparticles. These ingredients are not indicated on the label.

**Is the use of nanoparticles in baby formula regulated?**

The U.S. Food and Drug Administration (FDA) is charged with ensuring baby formulas are safe, however, the FDA does not approve the safety of infant formulas before they can be marketed. The FDA requires that baby formulas meet certain nutritional requirements and are screened for pathogens, and companies must register with

the FDA and provide a notice before marketing a formula. However, these rules do not include screening or safety testing of nanomaterials or other potentially toxic synthetic ingredients. Baby formulas are intended for our most vulnerable population and should be regulated with the utmost of care. A product fed to millions of infants should not be permitted to go to market if we are not certain that the ingredients it contains are safe for human consumption. All infant formulas should be thoroughly tested for safety.

### **Is there a difference in risk for children vs. adults?**

Infants may be at greater risk of suffering health harms from exposure to nanomaterials because of their more vulnerable physiology. Children's immune, central nervous, reproductive and digestive systems are still developing, and at certain early stages of development, exposure to toxicants can lead to irreversible damage which can increase risk of disease later in life.

### **Why are companies using these nanoparticles in baby formula?**

Nano-hydroxyapatite found in baby formula is most likely a calcium source for the formula or could be used as a stabilizer for the powder to maintain certain properties.

Nano titanium dioxide is a brightener or whitener for food and beverage products and is used as an anti-caking agent.

Nano silicon dioxide is used as a 'trickle and flow' aid in powdered food products, as a clearing agent in beer and wine, and as a food coating.

### **Are nanoparticles used in other kinds of products?**

Many nanomaterials have already entered wide-scale commercial use and can be found in hundreds of products, including transparent sunscreens; light-diffracting cosmetics; penetration-enhanced moisturisers; stain-, moisture- and odor-repellent fabrics; long-lasting paints and furniture varnishes; anti-bacterial household appliances such as vacuum cleaners, refrigerators and air conditioners; and sporting equipment.

Beyond baby formula, children's products that contain engineered nanoparticles include skincare products and sunscreens, supplements, food containers, pacifiers, teething blankets, toys and stuffed animals, baby bottles, toothbrushes, baby carriages, bibs, baby clothing and many other products.

### **Are some baby formulas nano-free?**

Each formula we tested contained some form of nanoparticles, however, not all of the nanoparticles we identified were in each formula. We are not certain if there are formulas that do not contain nano.

### **Why were the nano silicon dioxide and titanium dioxide results inconclusive?**

The Similac® Advance® OptiGRO™ formula we tested was in liquid form, which is harder to test than powdered formula. The product was tested once and found to contain nano TiO<sub>2</sub>; a second sample was tested months later and didn't show nano TiO<sub>2</sub>. In terms of the nano SiO<sub>2</sub> results, these are very small nanoparticles and are even more difficult to fully verify. For the Gerber® Good Start® Soothe formula, few particles were observed, making it difficult to conclusively confirm the presence of SiO<sub>2</sub> and TiO<sub>2</sub> as added ingredients.

### **More risk in the future if not addressed**

The commercialization of nanotechnology is moving quickly without sufficient regulatory oversight or studies on health and environmental impacts. Nanotechnology is currently in the first generation of innovation. In coming years and decades, the next generation of nanotechnology is forecast to bring more complex nanodevices, nanosystems and nanomachines. Nanobiotechnology may be used to manipulate the genetics of humans, animals and agricultural plants at the atomic scale and to incorporate synthetic materials into biological organisms and biological materials into synthetic structures.

### **Who did the laboratory testing?**

Friends of the Earth commissioned independent laboratory testing of baby formulas with a world-class nanotechnology research facility at the Arizona State University (ASU).



## What should FDA do?

- Enact a moratorium on new commercial nanotech products
- Assess safety of and recall baby formulas with nanoparticle ingredients
- Regulate nanomaterials as novel substances
- Extend the size-based definition of nanomaterials up to 500 nm in size
- Protect workers
- Label products that contain nanomaterials

## What should industry do?

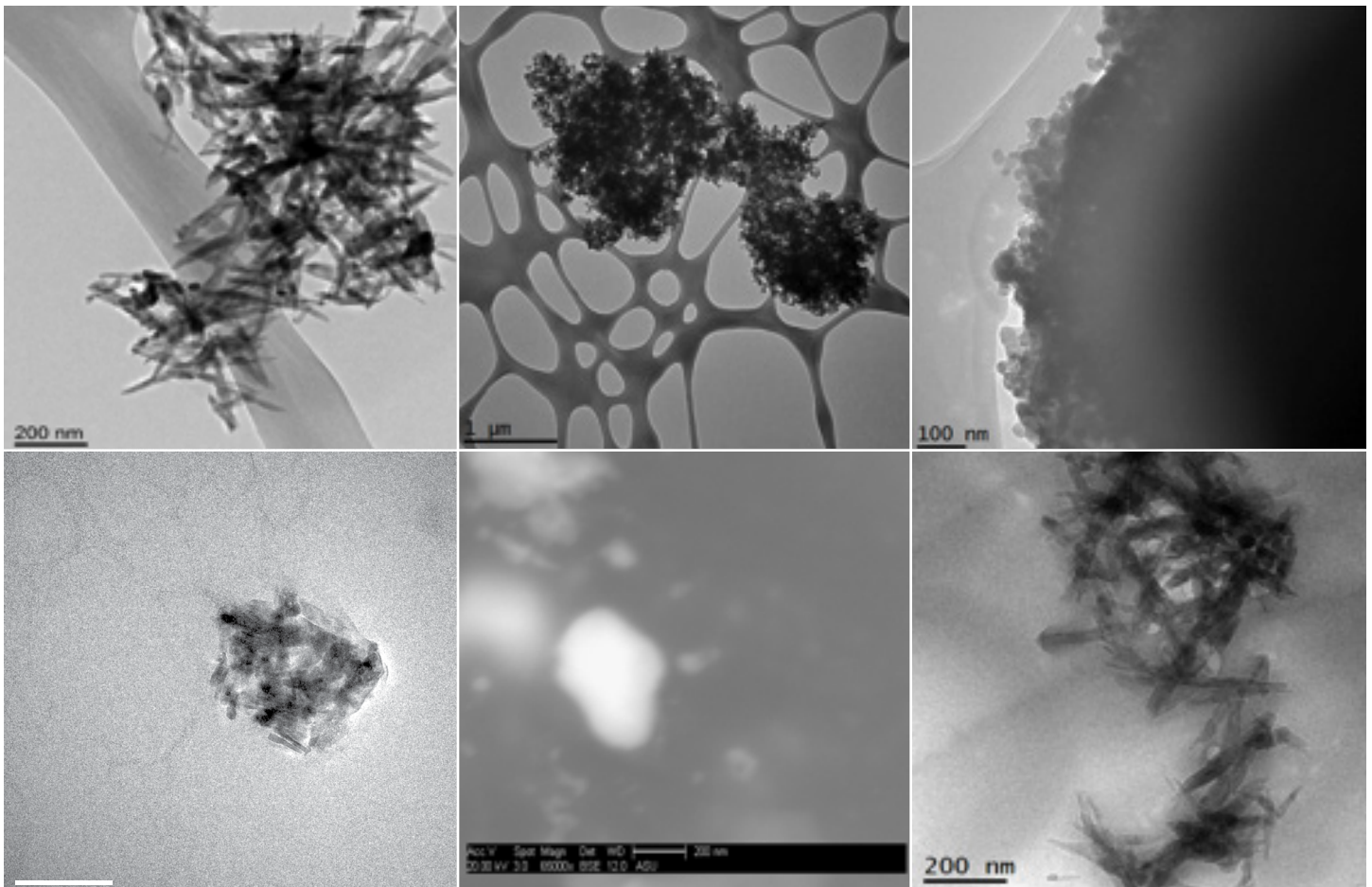
- Recall formula containing nanomaterials
- Remove nanomaterials from product formulas
- Create nanomaterial policies
- Ensure transparency in the supply chain through labeling

## What can consumers do?

Until government and industry regulate nanotechnology in a responsible and transparent manner, there are steps we can take to protect our health.

- Breastfeed when and if possible
- Hold government and industry accountable: Join Friends of the Earth to demand a moratorium on the use of nanotechnology in the food sector and urge policy makers to regulate and label food, food packaging and agricultural products containing manufactured nanomaterials
- Contact baby formula manufacturers and ask them to remove nanomaterials from their products

Visit our website to learn more about nanotechnology, take action and support our efforts to create a safe, just, resilient and sustainable food system for all. <http://foe.org/nano-report-baby-formula>



Electron microscopy images of nanomaterials found in baby formula provided by Arizona State University.