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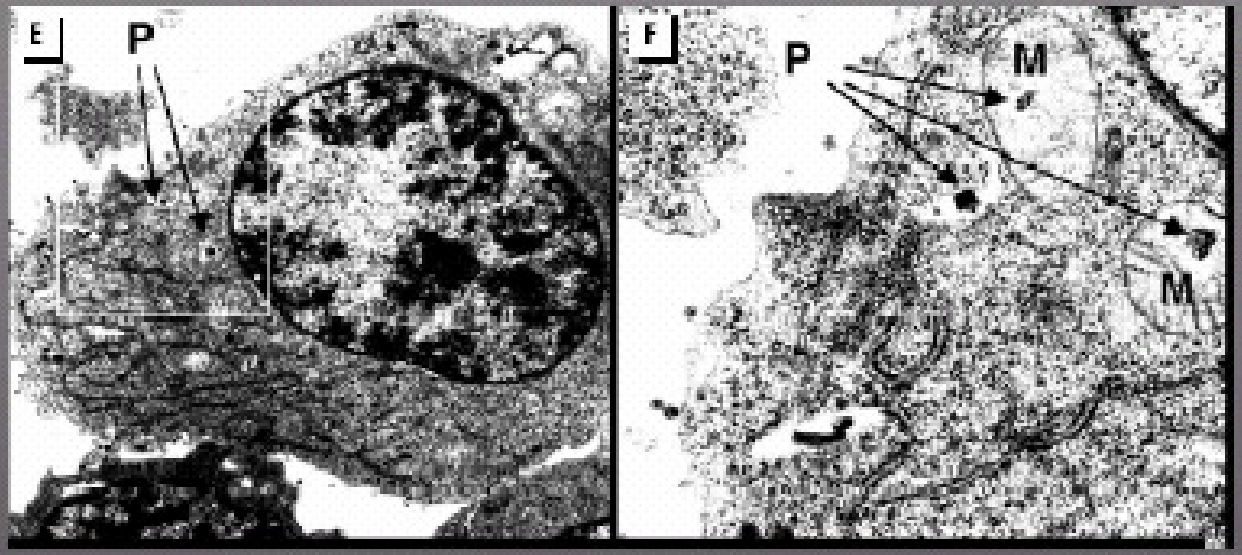
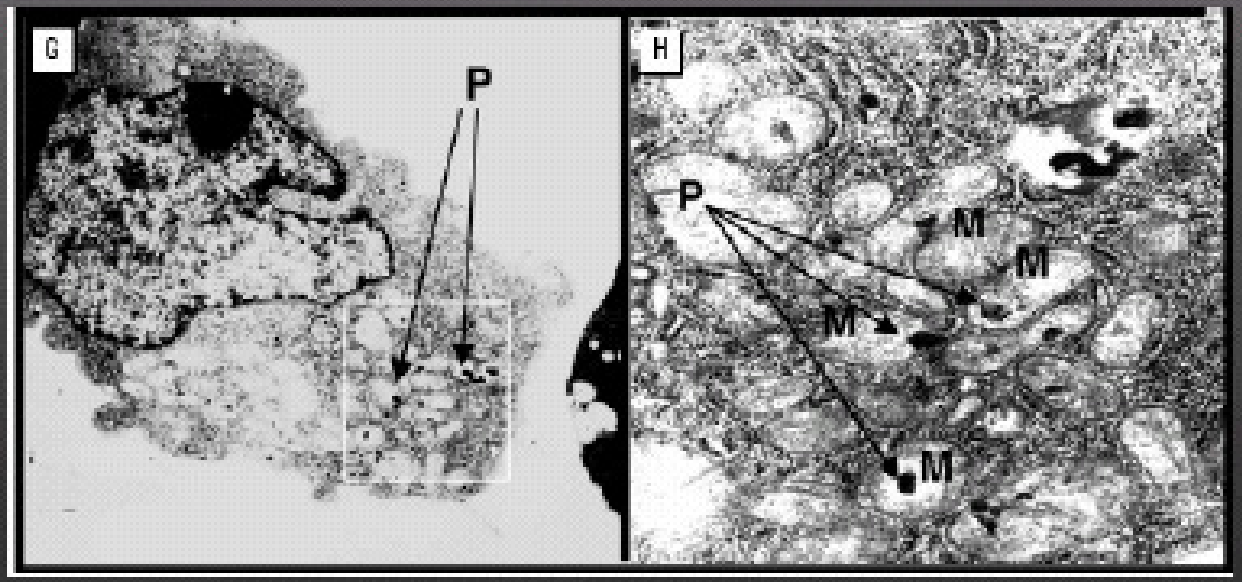
# Nanoparticles inside macrophage mitochondria




RAW246.7
+
fine PM




RAW246.7
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NP PM

# Peculiar characters of nano-material

- size effect
  - activated surface & great surface area
  - stratum change of referents and objectives

- new chemical character
  - enhanced reaction
  - transnormal reaction

- new dynamic character
  - cohesion (introjections and wanderings)
  - conversion (- self-multiplication)

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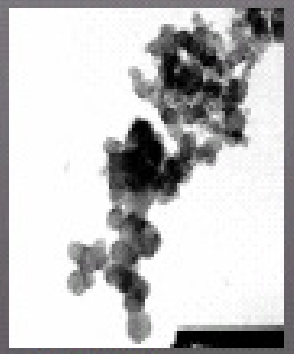
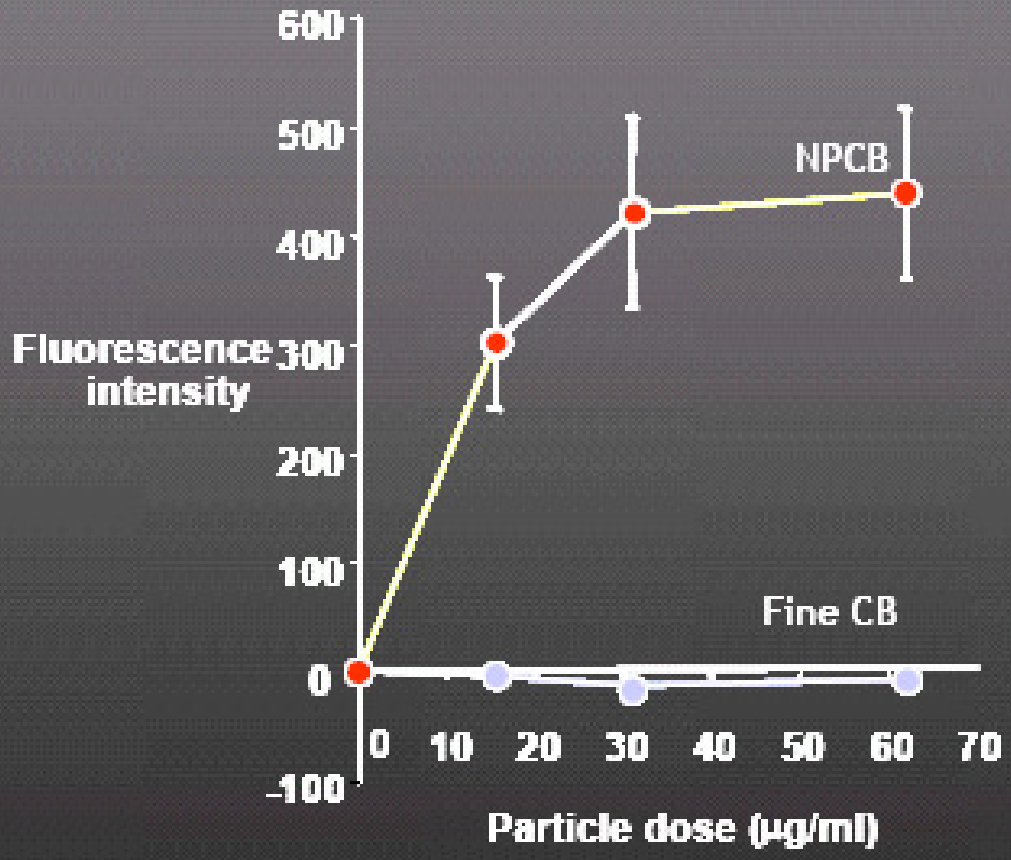
# Nanoparticles have more oxidant activity

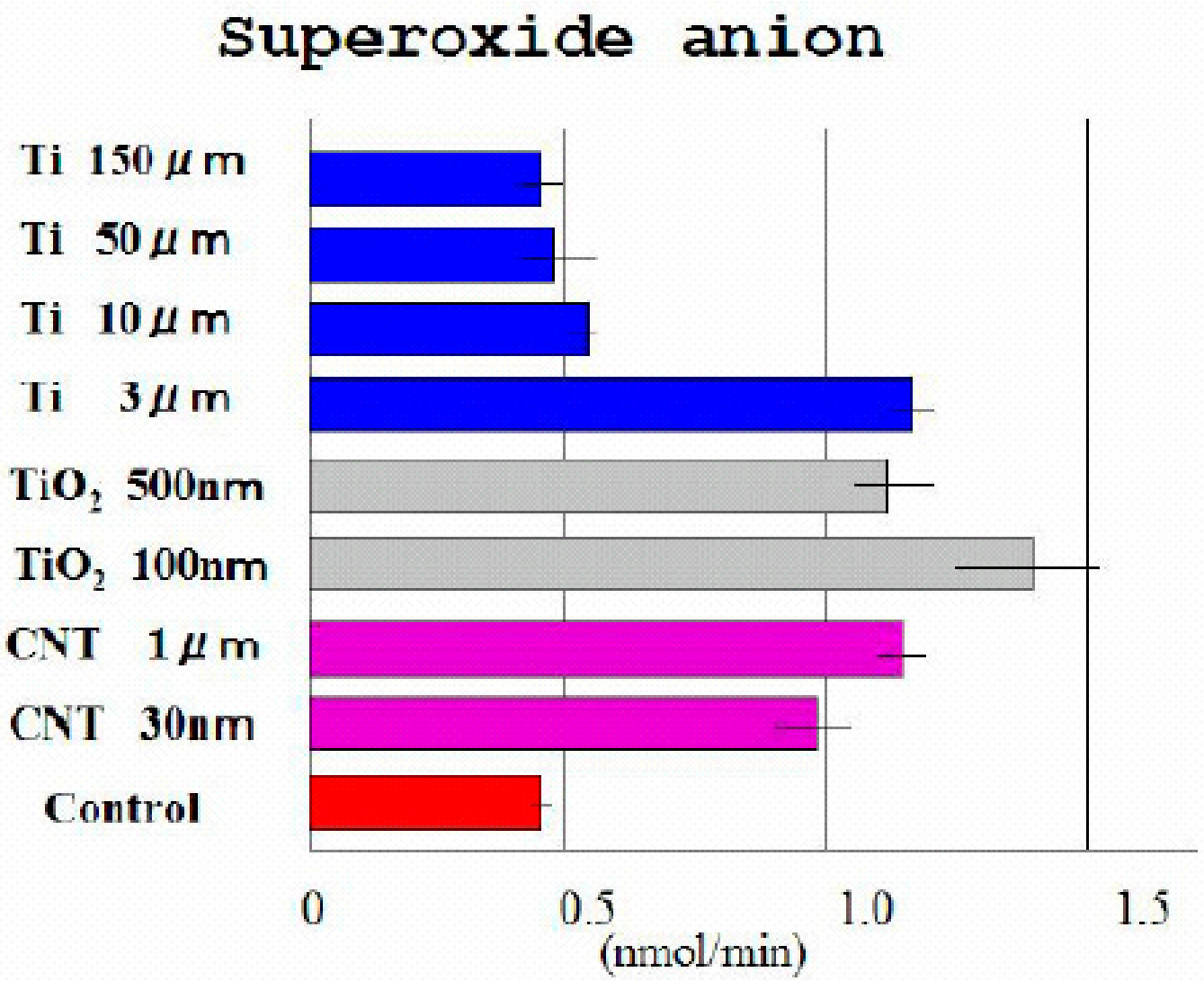
Nanoparticle




Fine


Wilson, M. R., J. H. Lightbody, K. Donaldson, J. Sales, and V. Stone. 2002. Interactions between ultrafine particles and transition metals in vivo and in vitro. *Toxicol.Appl.Pharmacol.* 184:172-179.

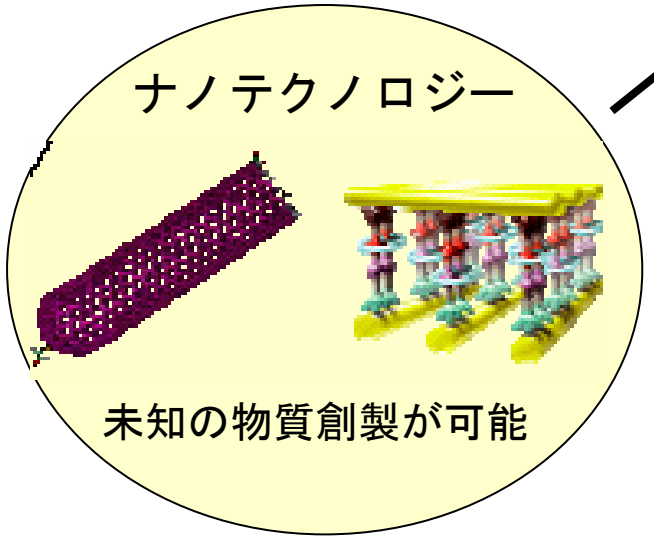



**Generation of superoxide anion by neutrophil for each size of Ti, TiO2, CNT particle**



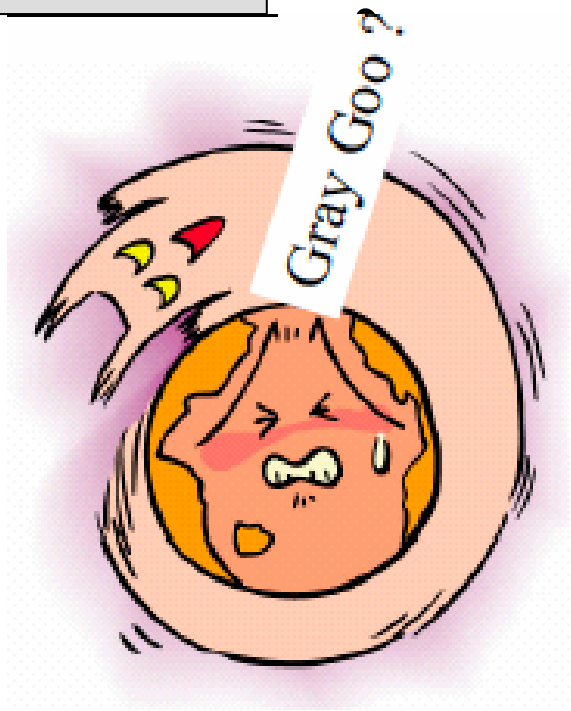
**by Prof.Watari, Hokkaido University**

# 背景




他の科学技術、産業・社会にも大きな革新をもたらす夢のテクノロジー

有害性、環境への影響が不明等の潜在的危険性を持つ




最悪のシナリオ

1. 有害物質の人体蓄積、環境氾濫
2. 風評による科学技術の停滞、社会とのギャップ拡大