NANOMEDICINE FOR ALL

A Campaign to Resolve Heart Disease by 2020, with a Potential Quick Win Before Then.

Calcified artery

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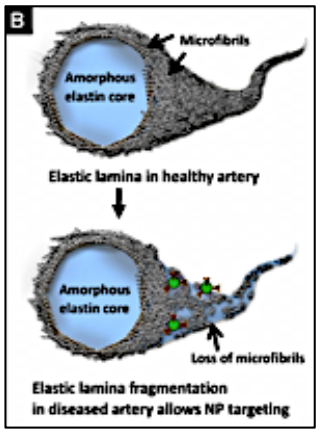

Damaged Elastin

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Nanotargeting for Therapy

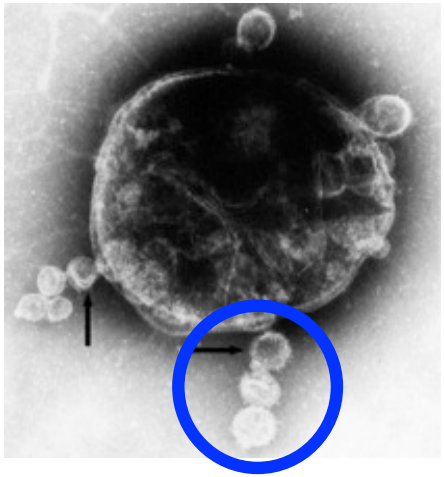
V 3.0

Is there clinical proof that nanomedicine works?

Nanomedicine Saved Millions of Children

- In the 1980's, 500,000 meningitis cases occurred annually causing 50,000 deaths, many of those among children. Survivors suffered lingering effects.
- Vaccine research using nanoparticles known as vesicles began in 1983 in Cuba & Norway. A 'vesicle vaccine' was developed then used successfully in Brazil, Chile, Cuba & New Zealand.
- “The mass vaccination…resulted in a sharp and sustained decline in general incidence.*" Millions of lives were saved.
- The Cuban vaccine won United Nations’ World Intellectual Property Organization Gold Medal in 1989.
- Today, a combination version of the vaccine is used by Novartis. As well, other types of nanoparticles are manufactured, regulatory approved, and used for targeting other diseases.

Bacterium releasing 'vesicles' used to manufacture the meningitis vaccine.



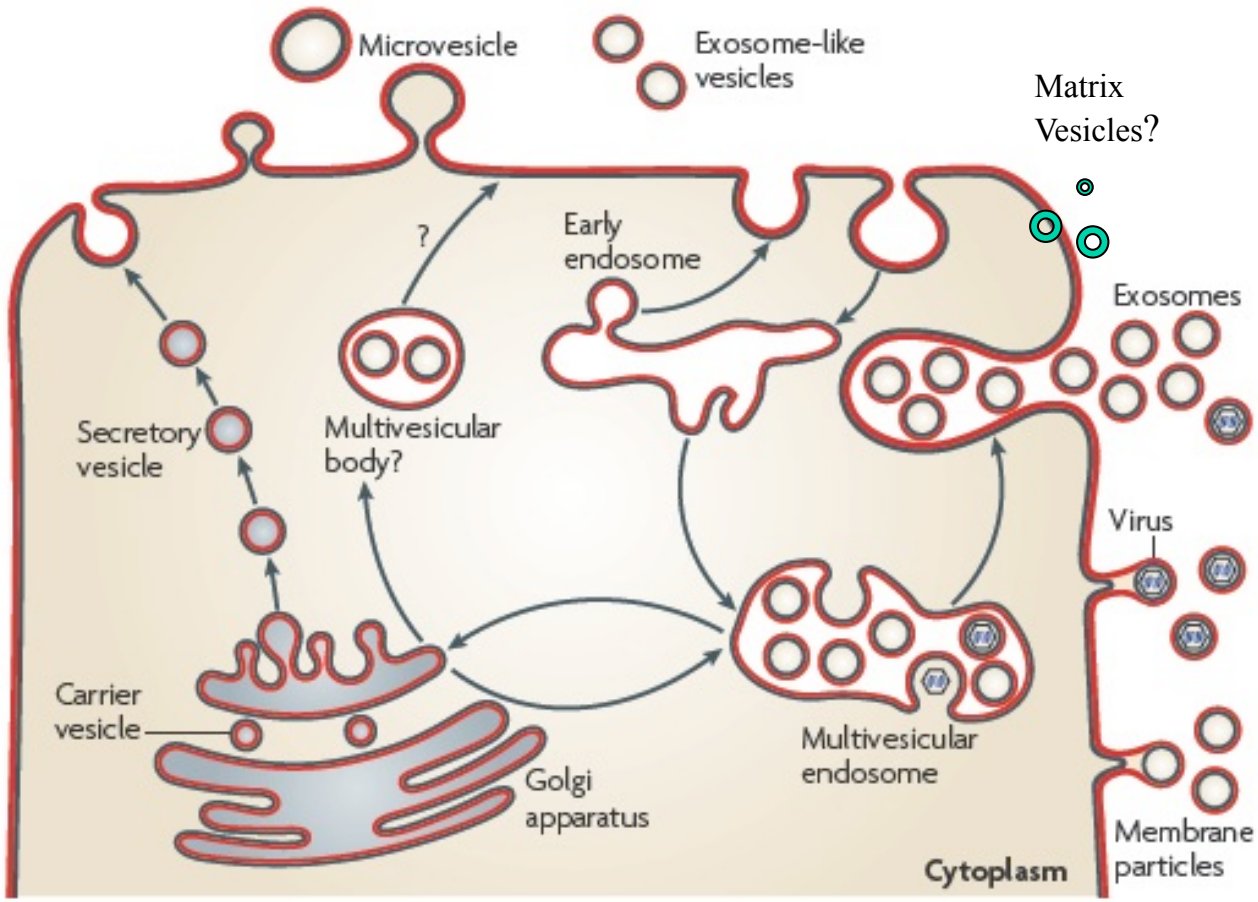
*Sources; MEDICC Review, Fall 2007, Vol 9, No 1, Infection and immunity, Aug. 2006, p. 4557–4565 Vol. 74, No. 8

The Nanomedicine Breakthrough

Every cell releases vesicles.

The 2013 Nobel Prize in Medicine was awarded for describing how these vesicles know where and when to deliver their cargo.

It is possible to synthesize the vesicles and use them for targeting disease.



Source. Membrane vesicles as conveyors of immune responses Clotilde Théry et al Nature Reviews Immunology volume 9 August 2009 | 581 Diagram modified to include matrix vesicles

Nanomedicine Advances for Heart Disease...

- **2013.** University researchers reverse coronary artery calcification in lab animals by using drug-loaded nanoparticles targeted at damaged elastin. Other researchers control inflammation in blood vessel tissue by using similar mechanisms.

- **OCTOBER 2015**. Researchers from 2 universities publish in *Circulation Research* that they used nanotargeting in lab animals to stop elastin degradation, calcification, and aneurysm development associated with heart disease.

- The potential from those discoveries is to get regulatory approval to 'fast- track' therapy in 5 years or less for patients who exhausted other options.

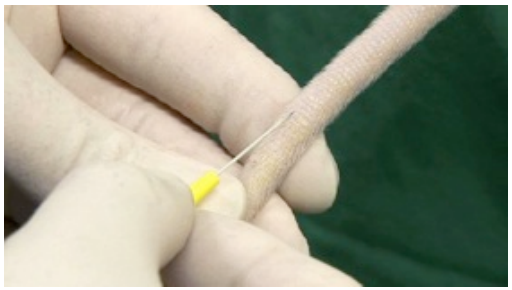


Image courtesy Sinha et al

...To Fill The Therapy Gap

- Everybody suffers from calcification and damaged elastin as they age.
- Millions of patients are “last hope” candidates for therapy.
- Nanotargeting is already used for heart disease, but only to treat symptoms.

Image Philips

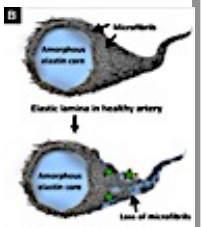
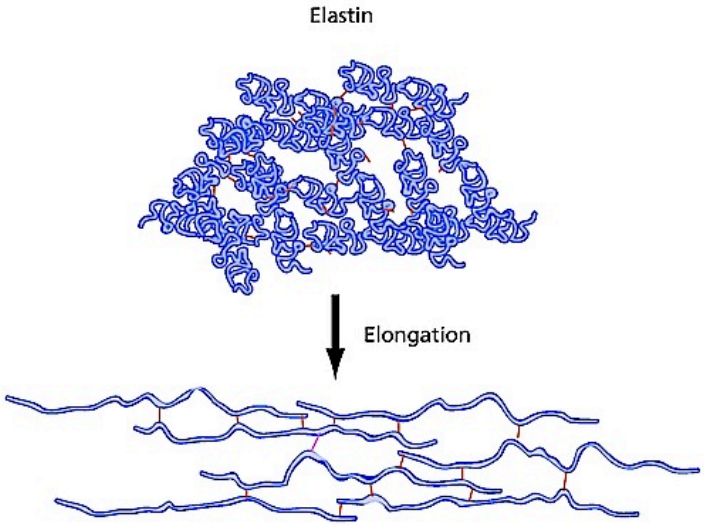


Image Sinha

Why Elastin Fiber & Calcification Are Targets...

ELASTIN FIBER

- Stretches to 8 times its resting length then contracts to let us breathe, circulate blood, & move.
- Elastin damage is a leading cause of aging.

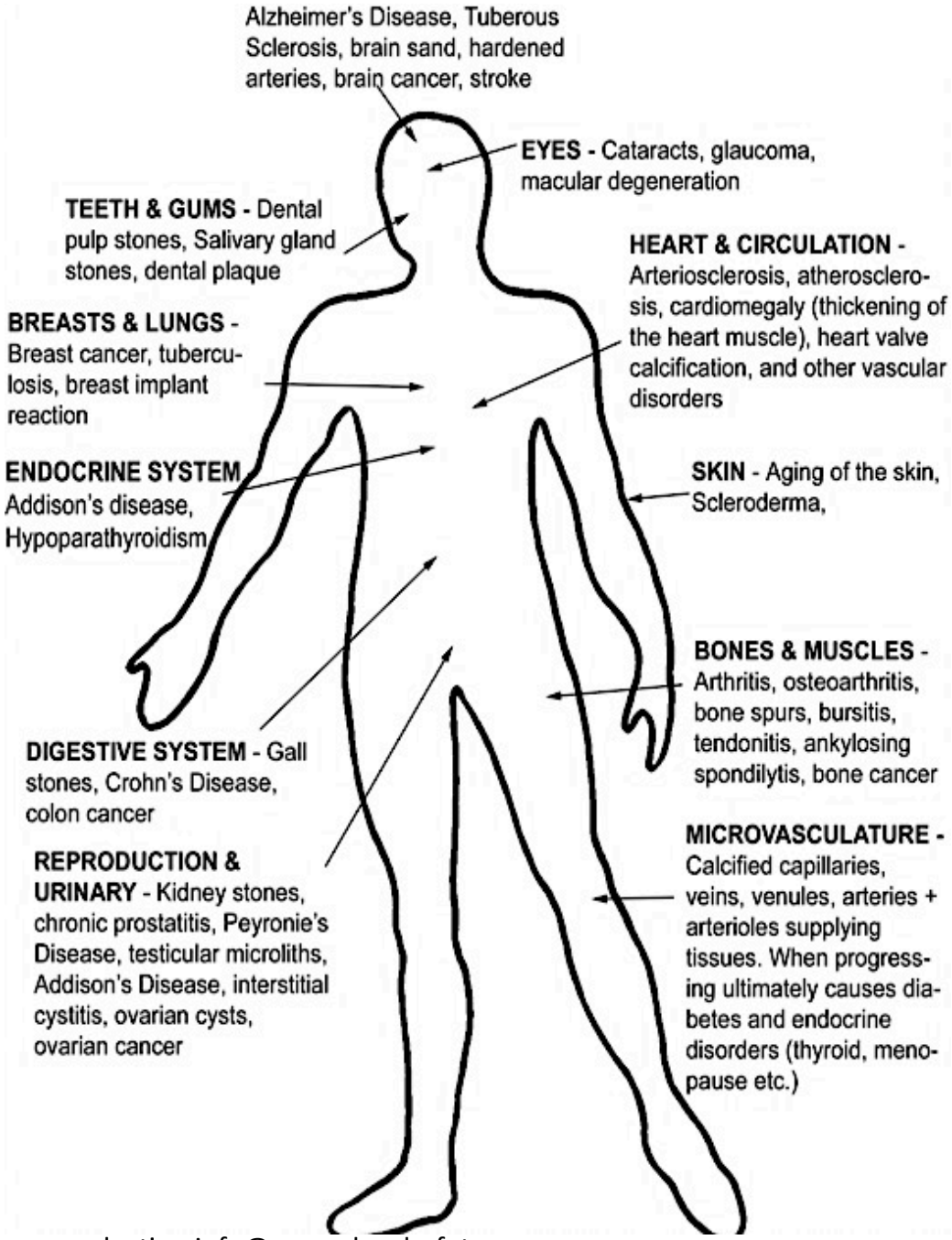


CALCIFICATION

- Contributes to most diseases on the leading causes of death list. See next slide.
- Damages elastin and restricts elasticity.
- No regulatory-approved, effective non-invasive treatment.

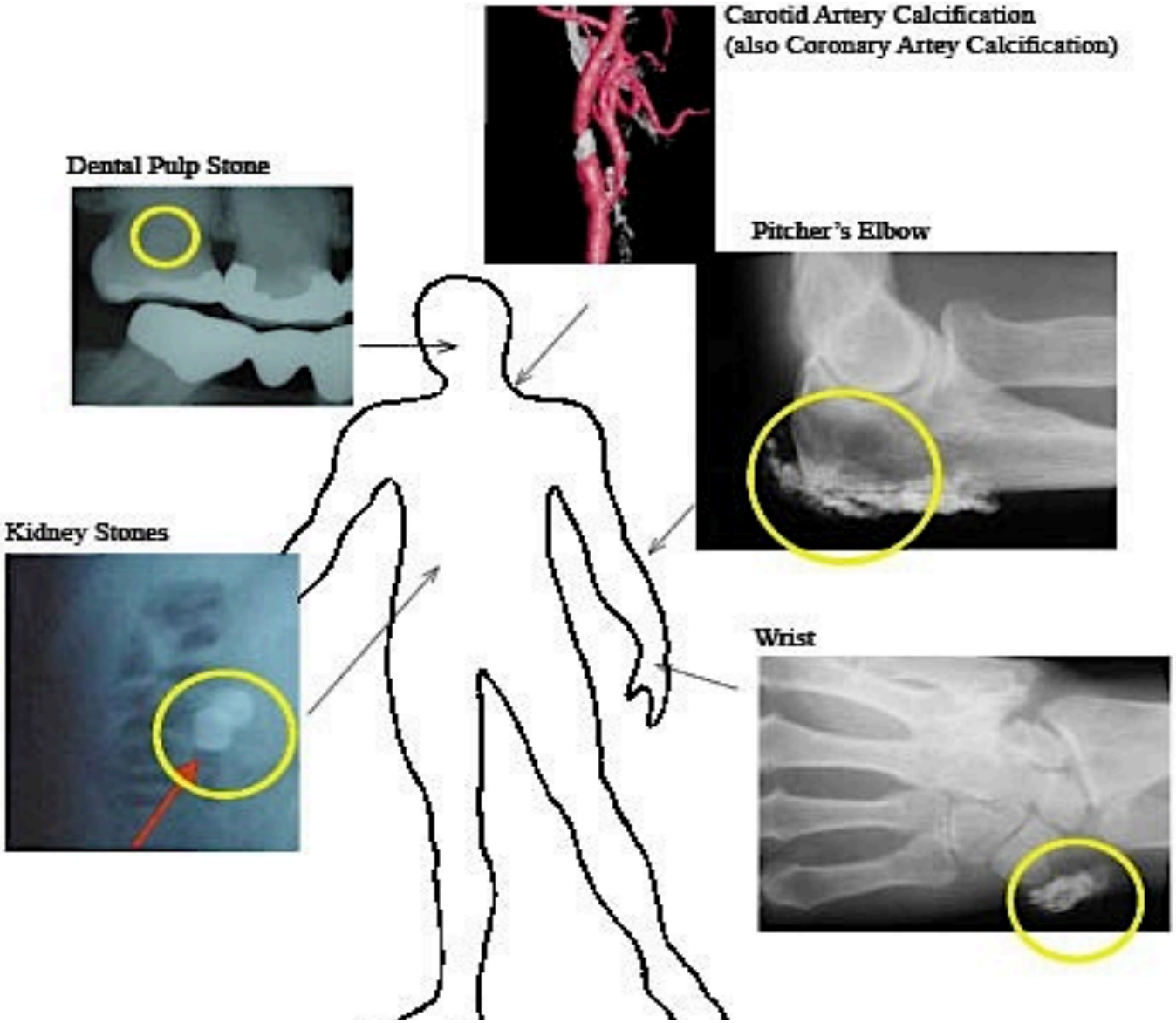
If You Know

someone with one of these conditions, then the approach is relevant for them.

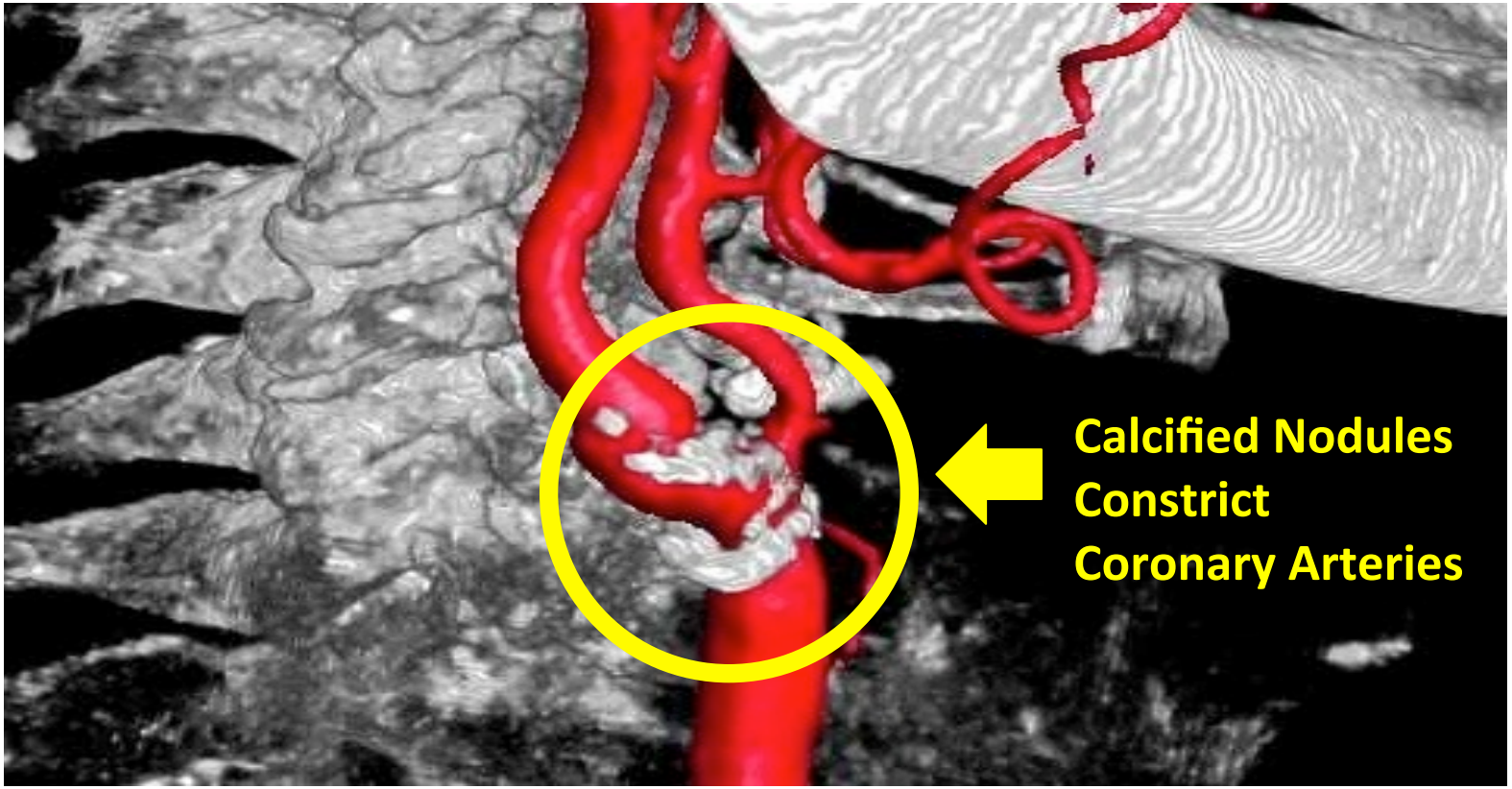


Calcifying Timebombs Ticking In Us

Vicious cycle of injury, inflammation & calcification



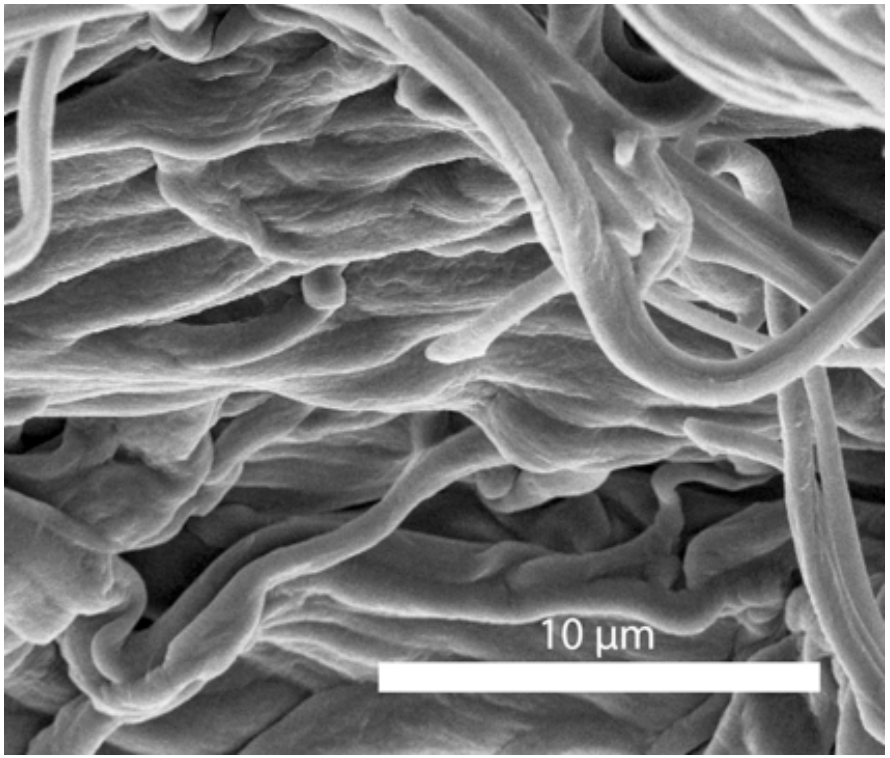
New Diagnostics Driving Demands for New Therapies



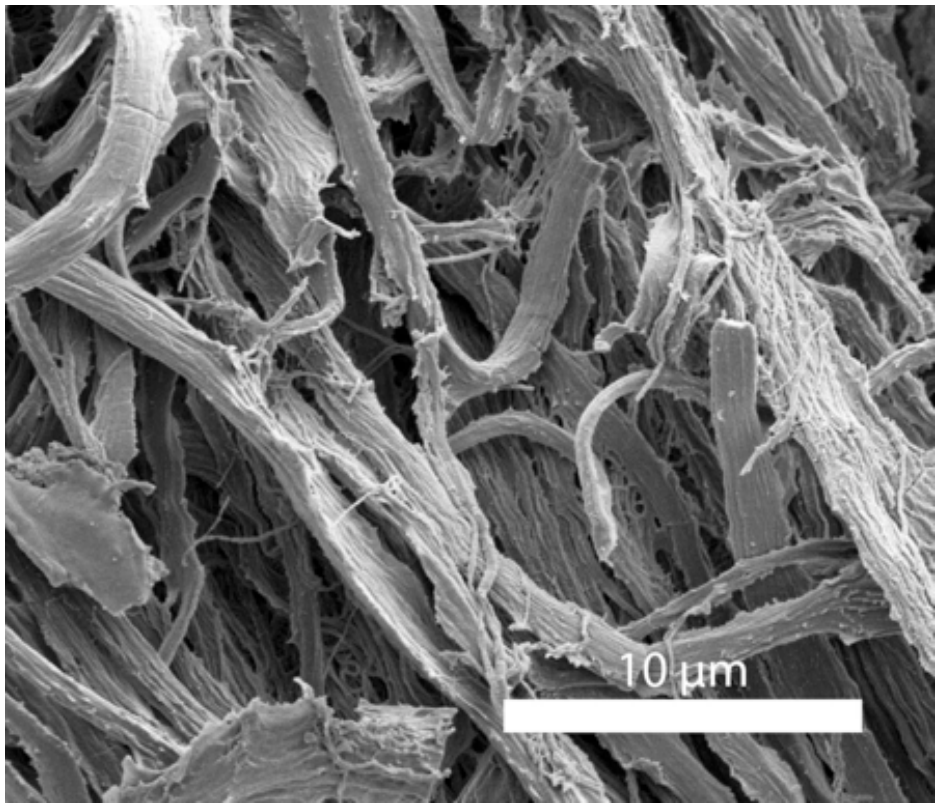
3D Angiograms Expose Calciifcation Impacts

Image Philips

Elastin is Degrading in Each of Us Every Day



Elastin in 5 year-old

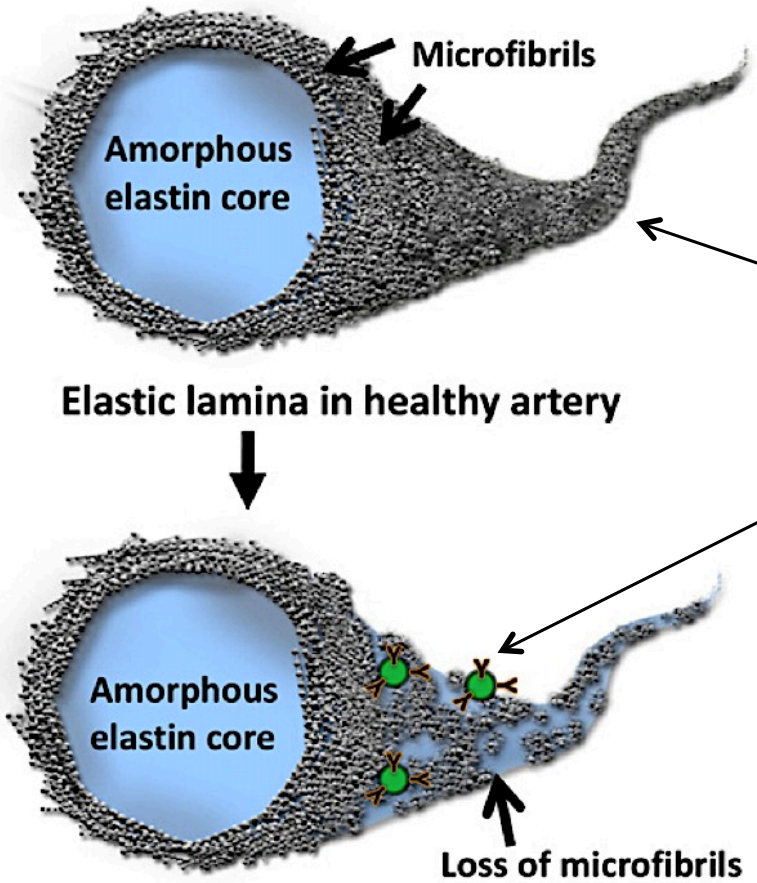


Damaged Elastin fibres in 90 year-old

Blood vessels pump less blood, Breathing is difficult, Stiffens movement, Appearance degrades.

Image Martin Luther University

... But Also Exposes Special Targets for Therapy



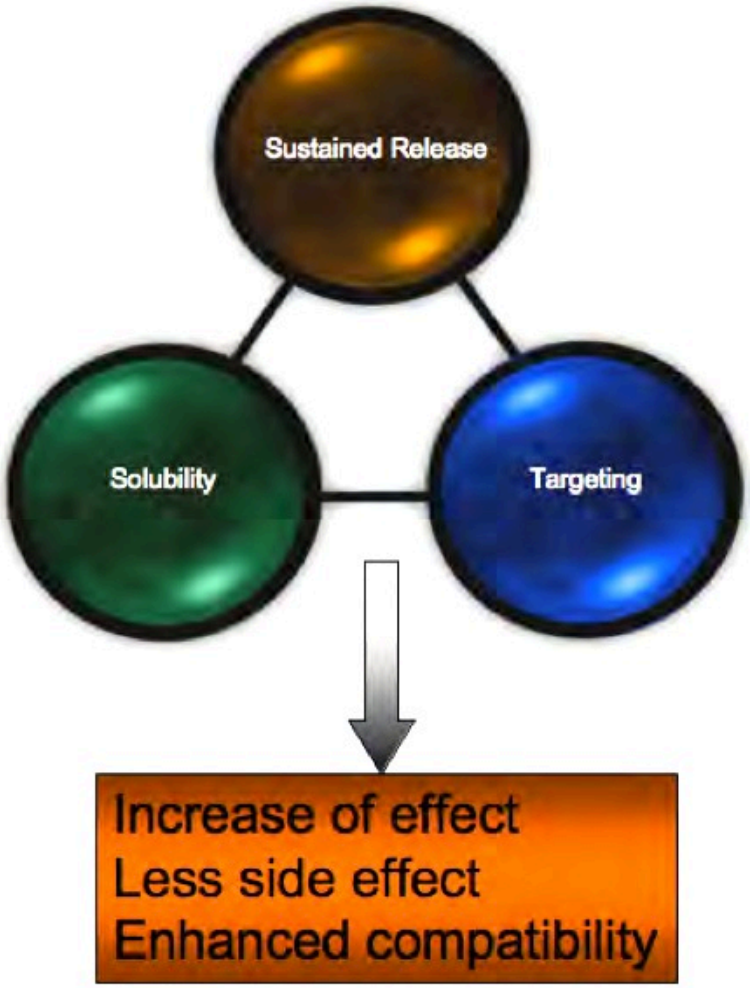
Elastin core shielded by microfibrils make fibers that expand & contract to let us move.

Elastin core exposed by damage is a target for antibodies.

Image courtesy Sinha et al

Nanotargeted Drug Delivery...

- Makes drugs more effective.
- Reduces side effects.
- Transforms symptom-treating drugs into potential cures.



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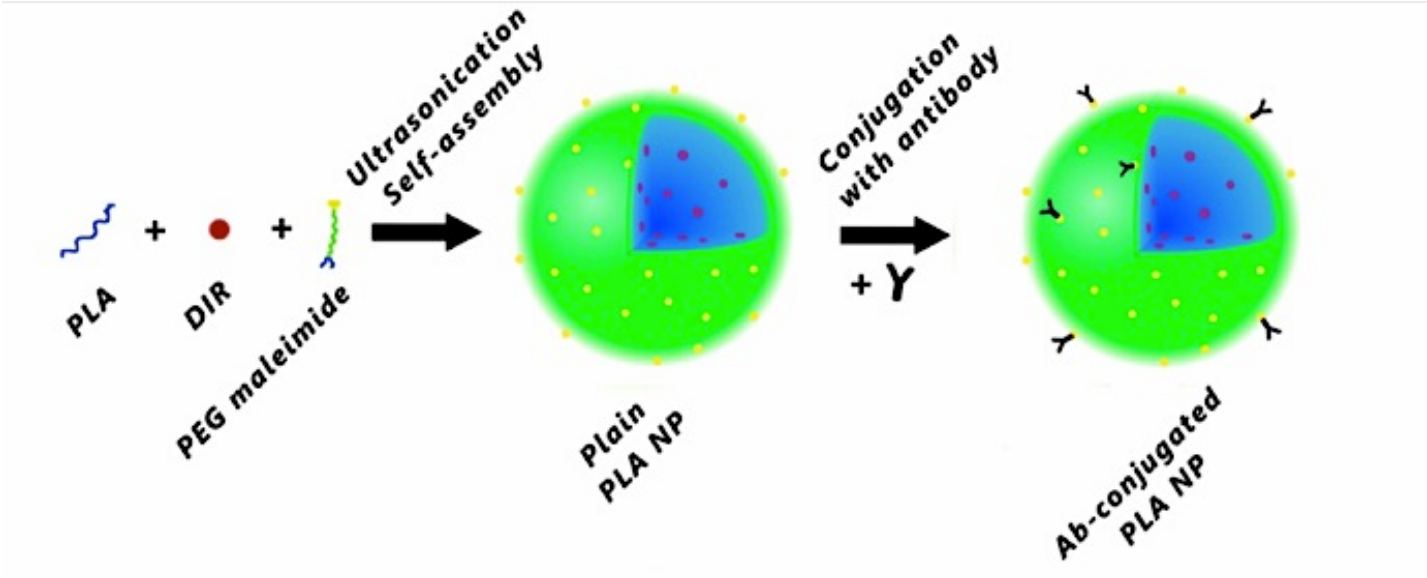
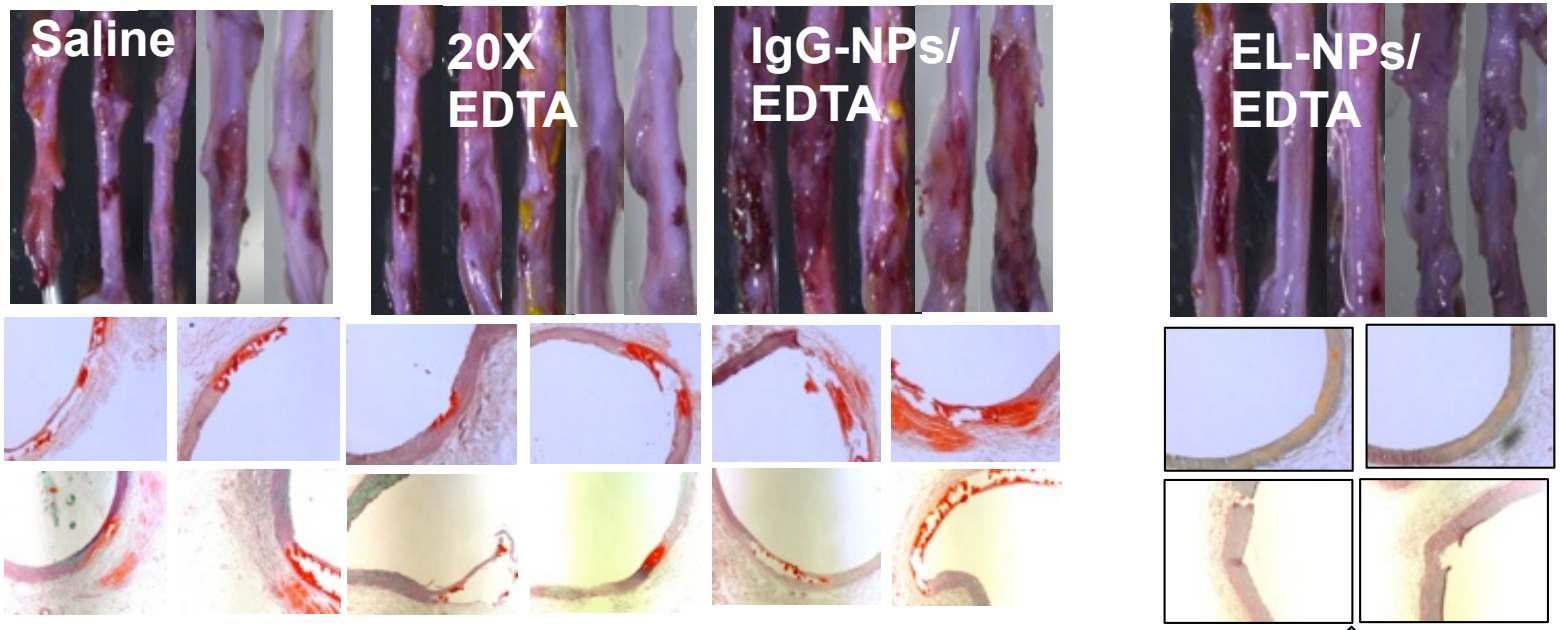
Nanotargeting Integrates 5 Tools

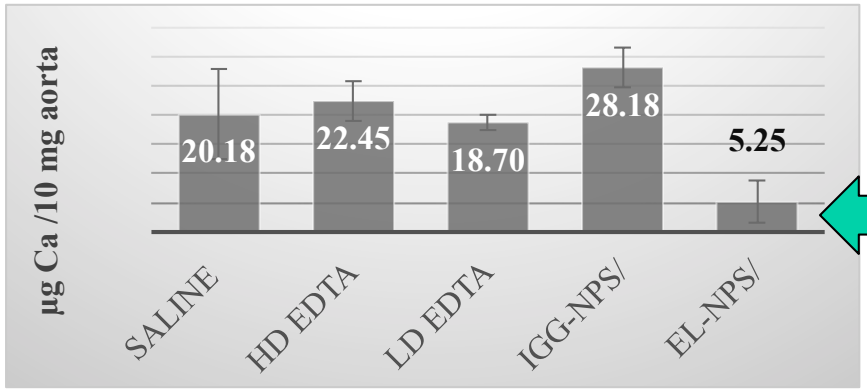


- Biodegradable nanoparticle of a type already approved for other therapies,
- Negative charging to prevent penetration of non-targeted cells,
- Antibody targeted to damaged elastin core fiber,
- Calcification & tissue-damaging substances targeted by active ingredients,
- Reduced doses eliminate side-effects & resistance potential.

 Image courtesy Vyavahare et al

The Results. NanoTargeting Reverses Calcification.





Only elastin targeting with nanoparticles works

Images courtesy Vyavahare et al

Potential Quick Win...

Evidence suggests that a combination of already-approved drugs might be effective against calcification, but the combination has to be tried with, and without, the nanotargeting platform.

Results from testing will be known relatively quickly; a few months from initiating the work.

If results are successful, a short-term solution might be available to 'last hope' patients, while the nanotargeting platform is being optimised. There is no guarantee, but costs of the experiment are relatively low.

The Campaign

The short-term aim is to develop a quick-win interim therapy while manufacturing a targeting antibody for use in humans.

A procedure is already established for 'humanising' antibodies, and for submitting those for clinical trials. About 50 antibodies are regulatory-approved or in process internationally, but a humanised antibody for targeting damaged elastin is still to be developed.

The amount is sufficient to test the potential quick win combination referenced in the previous slide, and take the antibody that is the basis for the therapy platform to the stage of being 'humanised'. After that, regulatory approval takes about 5 years. Substantially greater investment is required for that, but the humanised antibody is the basis for success !

How To Support...

Email info@ourmolecularfuture.com indicating your readiness to provide support.

You will receive an email after a structure is set up to transparently report results to contributors and hold contributions in a trust account until a sufficient amount is received to do the work.

The anticipated time to establish the structure is 90 – 120 days.

NANOMEDICINE FOR ALL

If you want to support bringing nanomedicine to everyone, contact;

info@ourmolecularfuture.com

Calcified artery

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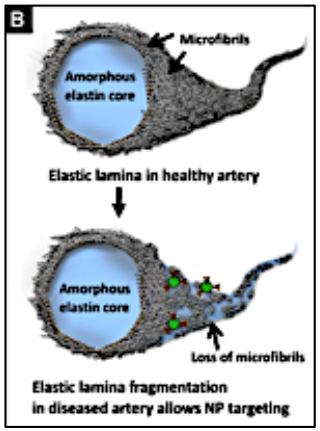

Damaged Elastin

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