



## Functional Nanoparticles for Selective Recognition of Biomarkers of Oxidative Stress

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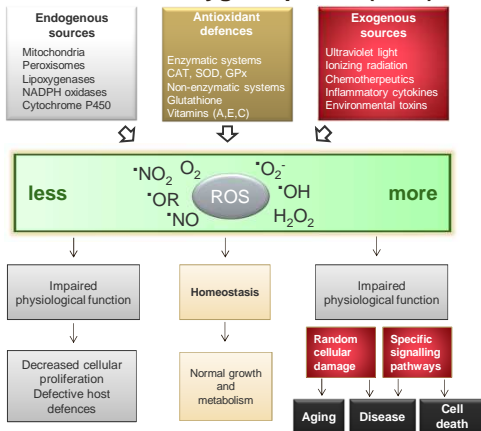


## AK Lämmerhofer Pharmazeutische (Bio)Analytik

- ☐ Pharmazeutische Analytik  
Verunreinigungsprofile, Enantiomerenanalytik
- ☐ Arzneistoffmetabolismus
- ☐ Metabolomics  
Metabolic profiling
- ☐ Biomarker Analytik  
Oxidativer Stress
- ☐ Biopharmazeutika-Analytik  
Oligonucleotide, Antikörper  
Plasmid DNA (Isoformen, Topoisomere)
- ☐ Funktionalisierte Trennmateriale  
Chirale stationäre Phasen  
Monolithische Polymere  
Medien für Biopharmazeutika-Reinigung  
Funktionalisierte Nanopartikel

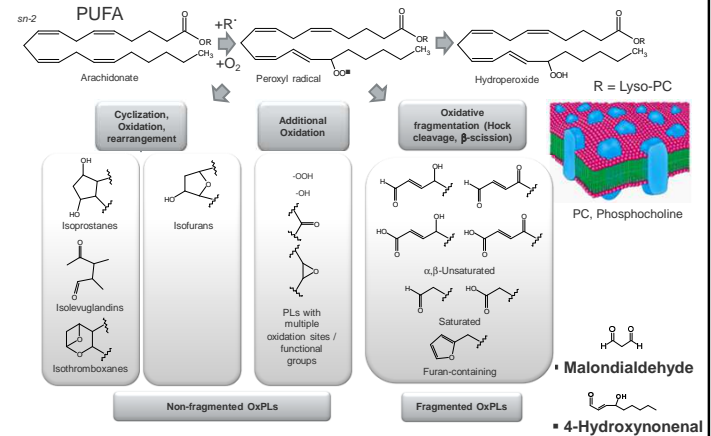


## Sources and Cellular Responses to Reactive Oxygen Species (ROS)



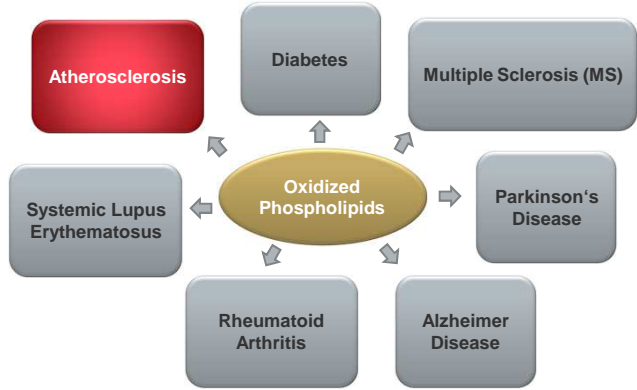
Source: Toren Finkel and Nikki J. Holbrook, Nature 408, 239-247(9 November 2000) doi:10.1038/35041687

## Molecular Complexity of Oxidized Phospholipids (oxPLs)



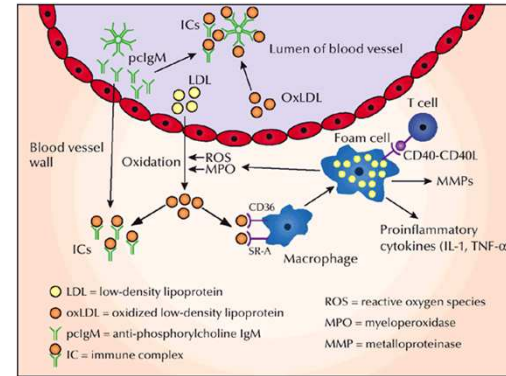
Bochkov et al. ANTIOXIDANTS & REDOX SIGNALING 2010, 12, 1009-10053

### Role of Oxidized Phospholipids and Oxidative Stress



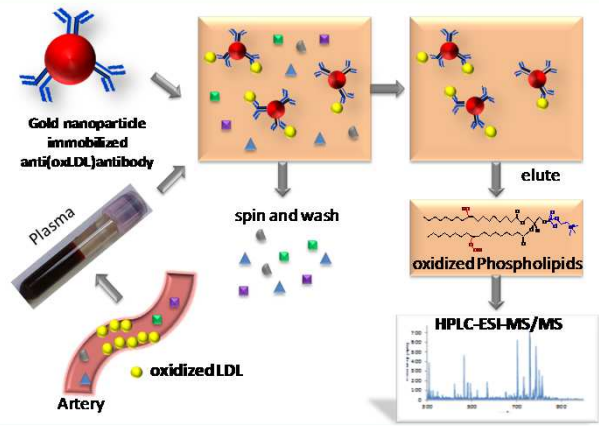
Free Radical Biology & Medicine 52 (2012) 266–280

### Oxidized LDL and its Role in Atherosclerosis

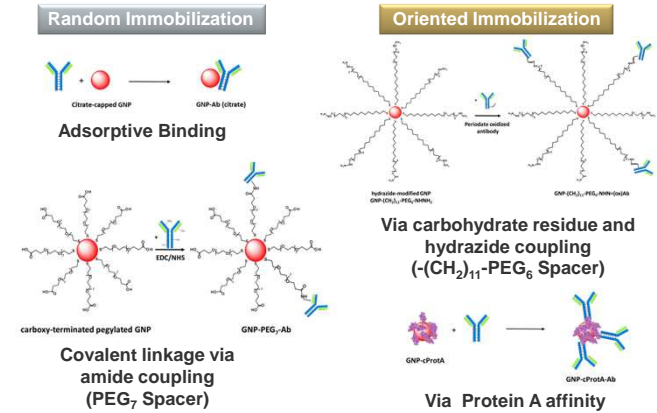


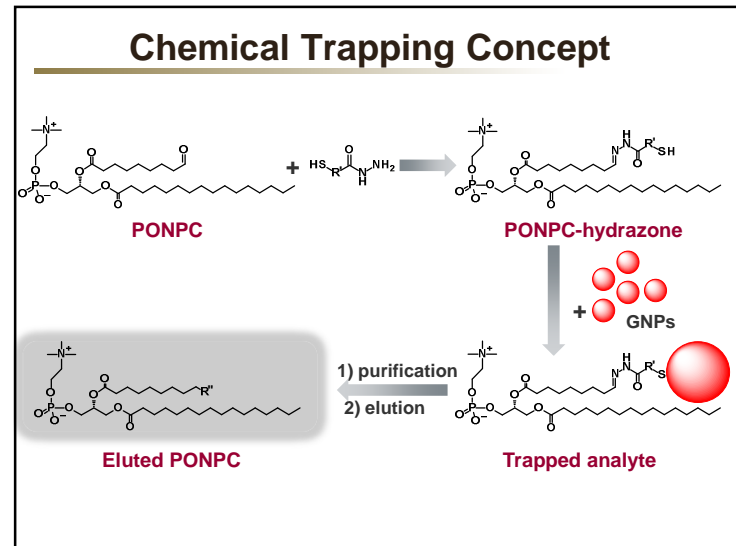
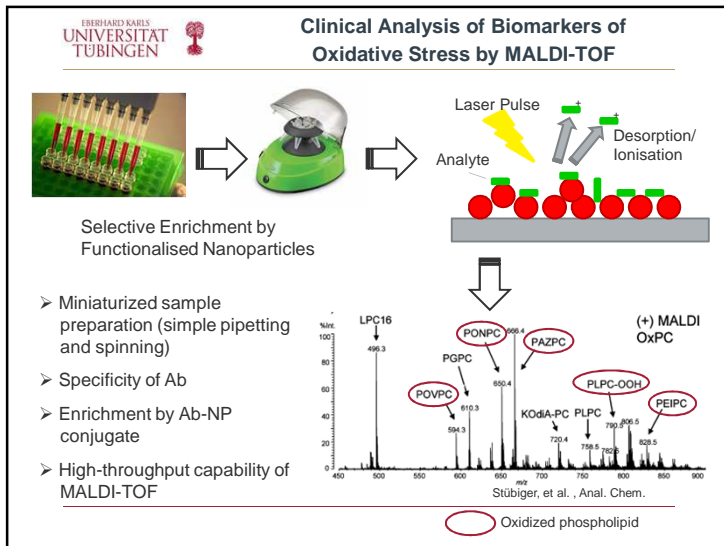
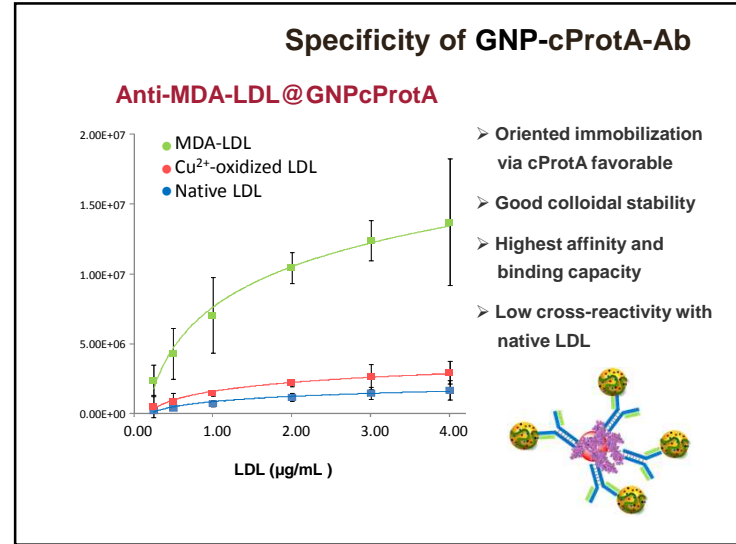
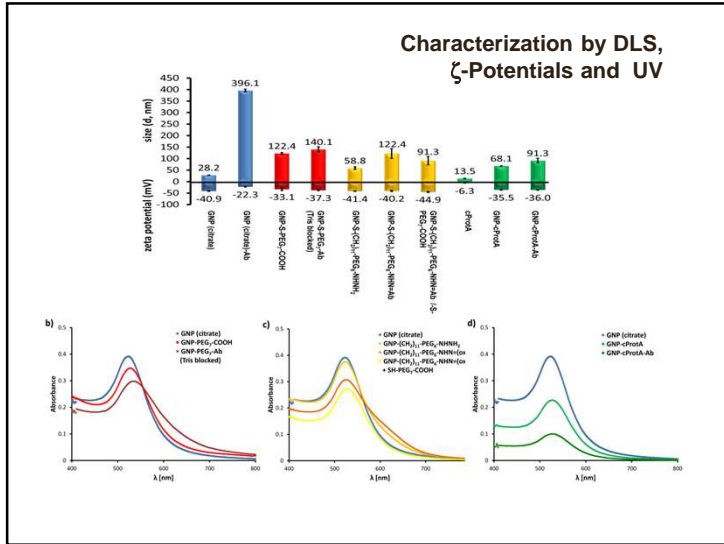
*Nature Medicine* 9, 641 - 642 (2003)  
doi:10.1038/nm0603-641 **Autoimmunity: busting the atherosclerotic plaque**  
Noel Rose & Marina Afanasyeva

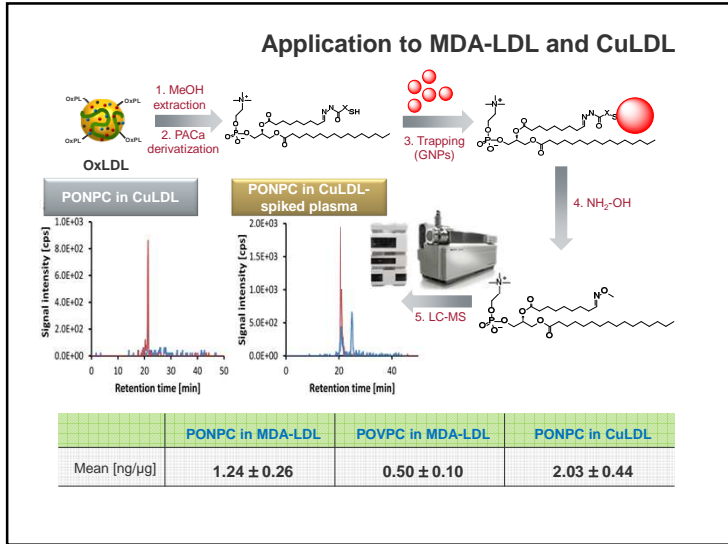
### Extraction of Oxidized LDL as Biomarkers



### Antibody Immobilization Strategies







### Outlook

- Development of method for comprehensive analysis of oxidized phospholipids
- Resolution of full structural complexity (incl isomers)
- Method for distinction between enzymatic oxidation and random oxidative modification

### Collaborations

- LC-QTOF-MS/MS Analysis (e.g. multi-target inflammation marker analysis, for validation purposes)
- Functionalized/engineered nanoparticles for molecular recognition and imaging purposes

