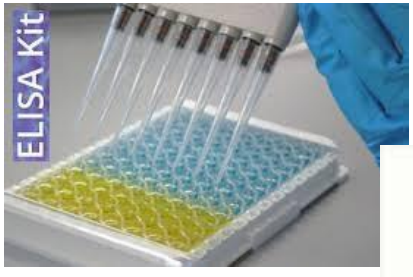
Who

The Bioanalytical LAB group

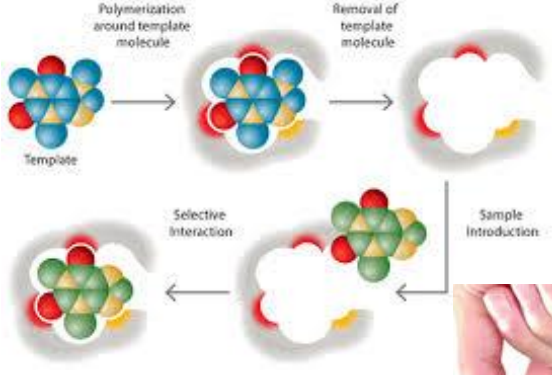
Prof Claudio Baggiani
Prof Laura Anfossi
1 post –doc
2 PhD students
6-8 undergraduate students

Expertise & research interest:

- ✓ Design, preparation and characterization of immunoreagents and conventional/novel immunomaterials
- ✓ Immunoassay and LFIA development and validation
- ✓ Preparation of imprinted artificial receptors towards different target molecules
- ✓ Characterization of the binding properties of imprinted materials



LFIA
Lateral Flow ImmunoAssay



Where

The bioanalytical lab

Department of Chemistry
Via P. Giuria 5

Instruments & Techniques:

- Immunoassay equipment
- LFIA equipment
- HPLC and LPLC with Uv, DAD and fluorescence detectors
- HPLC/MS-MS (ESI-IT)
- Capillary Electrophoresis Systems

Ongoing projects & collaborations:

- Companies: Prima Lab (CH)
- Institutions: Dept «G. Ciamician» (Bologna), Dept of Chemistry (Leicester, UK), Dept of Veterinary Sciences (Torino), Dept of Medical Sciences (Torino)

2019, June

What

Immunochemical methods

LFIA test development & validation:

- Point-of-care tests from the design to the prototype

Innovation in LFIA:

- Novel probes
- Multiplexing strategies

ELISA for specialised applications (food safety, veterinary, clinical diagnostics)

- Design and preparation of reagents, development, optimization, validation

Biomimetic receptors

Research trends:

- Preparation of nanoMIPs by solid phase polymer synthesis
- Binding characterisation of polymeric materials
- Development of target-selective analytical methods
- Actual targets: drugs, steroidal hormones, peptides & proteins, etc.

Requirements: mastering basic concepts of chemistry (analytical, organic, bio and physic chemistry), ability to organize workplan and time, good manual skills in a lab environment, curiosity and enthousiasm

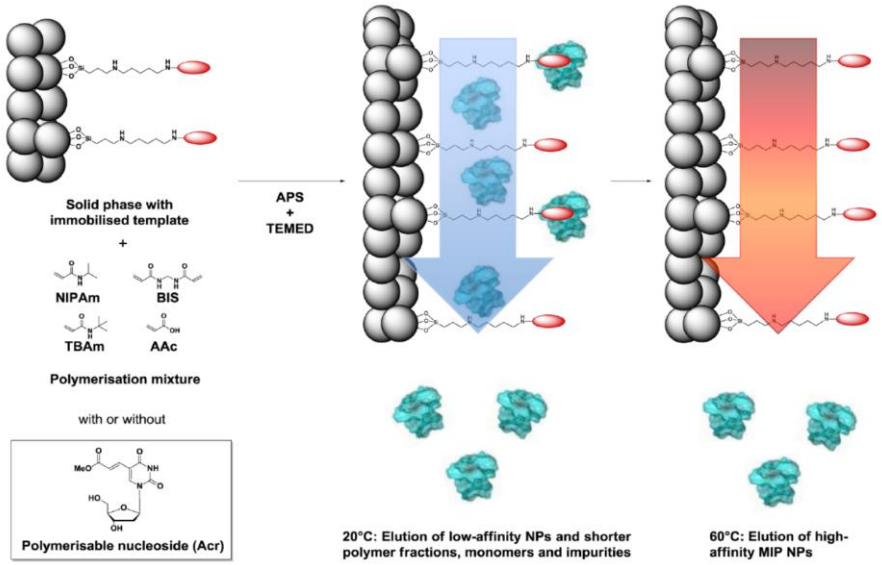
Expected duration: 7-9 months

Positions available (n/year): 2-3

please express your interest early on to plan the work in due time !!

Just a couple of examples…

solid phase polymer synthesis to get nanoMIPs



Goals:

- Selection of high affinity miniMIPs
- Study of the change of polymer composition & synthesis conditions on binding properties
- Use of miniMIPs in different formats in view of analytical and sensoristic applications

Workflow:

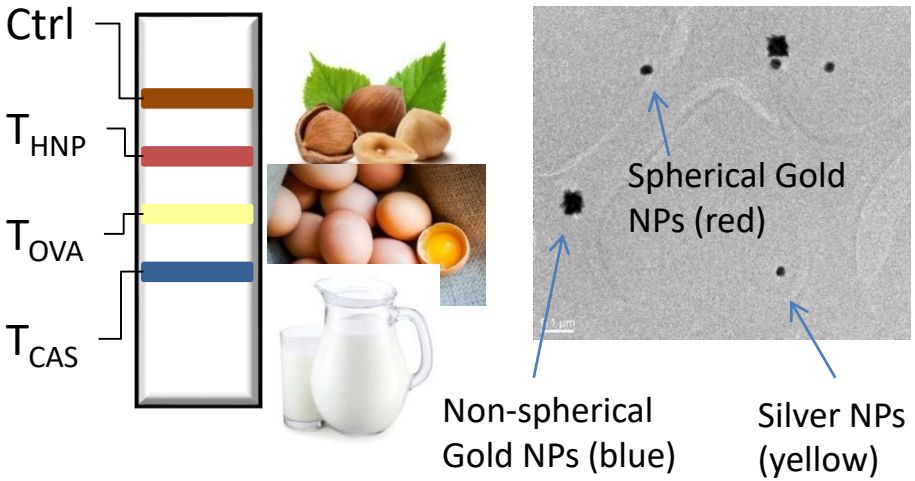
- Immobilization of the target on a glass-based solid support
- Thermo- or photo-polymerization inside the glass matrix
- Step-elution at variable experimental conditions to recover polymeric fractions
- Study of the binding properties

Achievements:

- To be continued…

Just a couple of examples…

metal NPs as multichromatic probes for multiplex LFIA



Goals:

- Simultaneous detection of three allergens
- Obtainement of metal NPs with different and brilliant colours
- NPs conjugation to bioreagents
- Detection in processed food

Workflow:

- Synthesis and characterization of metal NPs
- Bioconjugation and incorporation in the device in optimal condition
- Study of reciprocal interference of functionalized NPs
- Managment of matrix interference from food samples
- Analytical validation

Achievements:

- A multiplex LFIA able to detect simultaneously three major allergens in a single device
- Facile detection of the presence of hazardous substances and identification of the type of allergen through a colour code
- Succesful application to detect milk, egg and hazelnut allergens in biscuits

Just a couple of examples…

ELISA for candidate new biomarkers of prostate cancer in urine

Prostate Cancer Facts & Figures

Source: American Cancer Society

	2017	2018
Estimated New Cases	161,360	164,690
Estimated Deaths	26,730	29,430
A man will be diagnosed every…	3.3 minutes	3.2 minutes
A man will die from the disease every…	20 minutes	18 minutes

Goals:

- Sensitivity (extremely low LOD)
- Selectivity towards other similar compounds
- Limited or no sample treatment
- High-throughput

Workflow:

- Identification of (bio)reagents and incorporation in the device in optimal condition
- Assay architecture manipulation for maximize sensitivity
- Managment of matrix interference
- Analytical validation (selectivity, accuracy, precision)
- Analyze clinical samples to search for the biomarkers
- Chemometric analysis of results

Achievements:

- To be continued…