Setting up a Laboratory for Radioimmunoassay (RIA)

This is a list of the minimum equipment needed for an RIA laboratory, using the example of progesterone measurement using the solid-phase coated tube method. This list is made assuming that one has availability of sanitary laboratory space, with workbenches that have washable, non porous table tops, the necessary plumbing and electrical connections and a supply of various glassware such as beakers, flasks, and test tubes and holding racks.

A laboratory for performing RIA is classified as a ‘C’ type laboratory for radiological procedures. It must conform to the requirements of the national authority responsible for the regulation of radioisotopes and ionizing radiation, and laboratory personnel should be familiar with standard precautions for using radioactive materials (i.e., radiological protection, handling, disposal, and the procedures to complete in the event of spills of such materials).

Basic equipment (which can be shared for other laboratory activities):
Refrigerator and Freezer for storage of samples and reagents
Electronic balance (4 decimal places)
Water bath, (with capacity of approximately 15 L)
Still for distilled water
Magnetic stirrer, with set of magnetic followers
Table-top Deionizer

Equipment that may be primarily dedicated to RIA work:
Table top centrifuge, up to 3,000 g, with timer, rotor, and buckets suitable for 7, 10 and 15 ml tubes
Laboratory pH meter
Gamma counter, single or multi-well (for 125-I)
Portable contamination monitor (for 125-I)
Vortex mixer - mini shaker
Eppendorf-type pipettes: 10-100 µl, 20-200 µl, and 100-1000 µl; with corresponding tips
Adjustable repeater pipette with combitips of 1, 5, 10 and 50 ml

Small equipment and other items:
Sponge racks for holding and decanting assay tubes
Pasteur pipettes and corresponding rubber bulbs
Graduated pipettes, 10 ml
Centrifuge tubes, 10-15 ml
Disposable gloves
Parafilm M

Equipment for sampling in the field:
For sampling blood (plasma progesterone): Vacutainer tubes, 7-10 ml, with heparin or EDTA
For storage of plasma samples: plastic tubes, 2-5 ml capacity
For sampling milk (milk progesterone): 20-30 ml, plastic, wide neck
Preservative for milk: Sodium Azide tablets
For storage of skim milk samples: plastic tubes or jars, 5-10 ml capacity
Ice boxes for temporary storage and transportation of samples (approximately 30 L capacity)
Halters or squeeze chutes for restraining animals, if necessary
Adhesive labels and markers

Consumables and chemicals:
RIAs
If kits are not to be used (e.g. FAO/IAEA ‘Self-Coating’ method):
Nunc-type maxisorp startubes, 75x12mm
Cryotubes, 1ml
Phosphate Buffered Saline tablets
Carbonate/bicarbonate buffer tablets
Bovine Serum Albumin
Glycerol
Tween 20
125-I progesterone tracer
Progesterone monoclonal antibody

For making progesterone standards:
Progesterone (high purity)
Activated charcoal powder