

## Human IL-4 ELISPOT Kit PVDF Format



- |                                      |             |                                      |             |
|--------------------------------------|-------------|--------------------------------------|-------------|
| <input type="checkbox"/> 856.011.005 | 5x96 wells  | <input type="checkbox"/> 856.011.010 | 10x96 wells |
| <input type="checkbox"/> 856.011.015 | 15x96 wells | <input type="checkbox"/> 856.011.020 | 20x96 wells |

### Intended Use

The ELISPOT assay is designed to enumerate cytokine producing cells in a single cell suspension. This method has the advantage of requiring a minimum of *in-vitro* manipulations allowing cytokine production analysis as close as possible to *in-vivo* conditions in a highly specific way. This technique is designed to determine the frequency of cytokine producing cells under a given stimulation, and the follow-up of such frequency during a treatment and/or a pathological state.

### Principle of the method

After cell stimulation, locally produced cytokines are captured by a specific monoclonal antibody. After cell lysis, trapped cytokine molecules are revealed by a secondary biotinylated detection antibody, which is in turn recognised by streptavidin conjugated to alkaline phosphatase. PVDF-bottomed-well plates are then incubated with BCIP/NBT substrate. Colored "purple" spots indicate cytokine production by individual cells.

### Content of the Kit for 5x96 wells

- Capture antibody (0.50 mL). Supplied sterile
- Biotinylated detection antibody (lyophilized, resuspend in 0.55mL). For storage, see page 4.
- Streptavidin - Alkaline Phosphatase conjugate. Store at + 4 °C.
- Bovine Serum albumin (1 g). Store at + 4 °C.
- Skimmed dry milk (1 g). Store at room temperature.
- Ready-to-use substrate buffer (50mL). Store at + 4 °C.

### Materials / Reagents not provided

- Cell culture media
- CO<sub>2</sub> incubator
- 70% ethanol
- Tween 20
- Phosphate buffered saline



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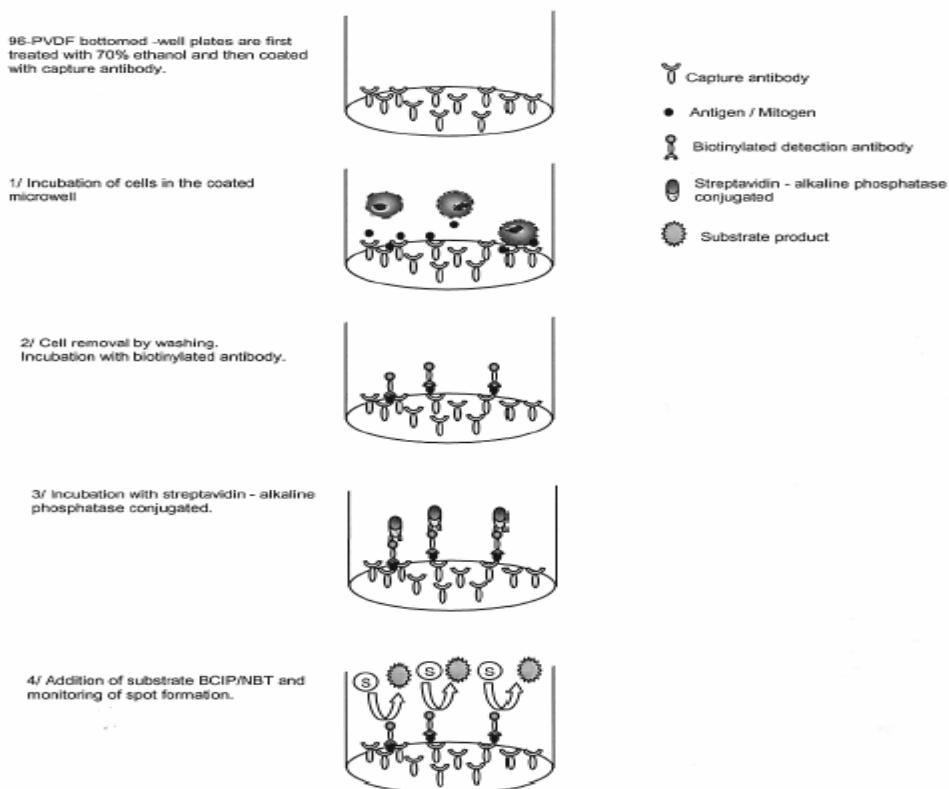
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## Direct versus Indirect ELISPOT

Cells can either be stimulated directly in the antibody coated wells (Direct) or, first stimulated in 24 well plates or flask, harvested, and then plated into the coated wells (Indirect).

The method used is dependent on 1) the type of cell assayed 2) the expected cell frequency. When a low number of cytokine producing cells are expected it is also advised to test them with the direct method, however, when this number is particularly high it is better to use the indirect ELISPOT method. All the procedures beyond the stimulation steps are the same whatever the method (direct/indirect) chosen.

### Procedure Summary



**Stimulation protocol:** IL-4 production by CD4<sup>+</sup> T cells upon stimulation by PMA and Ionomycin  
**This protocol is given as a suggestion.**

As the frequency of IL-4 producing cells among PBMC is low, and as this population is mainly found among CD4<sup>+</sup>T cells, we recommend enriching the CD4<sup>+</sup> T cell population either by depletion or by direct selection. Dilute CD4<sup>+</sup> cells in culture media (e.g. RPMI 1640 supplemented with 2mM L-glutamine and 10% heat inactivated fetal calf serum) containing 1ng/ml PMA and 500ng/ml ionomycin (Sigma, Saint Louis, MO). Distribute 2.10<sup>5</sup> to 2.5.10<sup>5</sup> cells in antibody coated PVDF-bottomed-wells and incubate for 10-15 hours in an incubator. For other stimulators incubation times may vary, depending on the frequency of cytokine producing cells, and should be optimized in each situation.



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## Reagent Preparation

- **Detection antibody**  
Reconstitute the lyophilized antibody with 0.55mL of distilled water. Gently mix the solution and wait until all the lyophilized material is back into solution.  
*If not used within a short period of time, reconstituted detection antibody should be aliquoted and stored at -20°C. In these conditions the reagent is stable for at least one year.*
- **Streptavidin alkaline phosphatase**  
Dilute 1/5000 in PBS 1% BSA. We recommend to proceed in two steps:  
*Step 1: Pre-dilution 1/100: 5 µl of streptavidin alkaline phosphatase in 495 µl of PBS 1% BSA.*  
*Step 2: Dilution 1/50: for one plate 200 µl of pre-dilution + 9.8 mL of PBS 1% BSA*  
DO NOT KEEP THE DILUTIONS FOR FURTHER EXPERIMENTS
- **Phosphate buffered saline (10X Concentrate solution).**  
For 1 liter weight : 80g NaCl ; 2g KH<sub>2</sub>PO<sub>4</sub> ; 14.4g Na<sub>2</sub>HPO<sub>4</sub>·2H<sub>2</sub>O. Add distilled water to 1 liter. Check that pH is comprised between 7.2 and 7.4. **Dilute the solution to 1X before use.**
- **2% dry skimmed milk in PBS**  
For one plate dissolve 0.2 g of powder in 10 mL of 1X diluted PBS.
- **1% BSA in PBS**  
For one plate dissolve 0.2 g of BSA in 20 mL of 1X diluted PBS.
- **0.1% Tween in PBS**  
For one plate dissolve 100µl of Tween 20 in 100 ml of 1X diluted PBS.
- **70% ethanol in water**  
For one plate mix 7 ml of ethanol with 3 ml of distilled water.

## Reagent Storage

- a) If not used within a short period of time, reconstituted detection antibody should be aliquoted and stored at -20°C.
- b) Substrate buffer should be stored at +4°C.
- c) Streptavidin-Alkaline phosphatase should be stored at +4°C.

## ELISPOT PROCEDURE

1. Incubate PVDF-bottomed-well plates with 25µl / well of 70% ethanol for 30 sec at room temperature.
2. Empty wells and wash three times with 100µl / well of PBS.
3. Pipette 100µl of capture antibody in 10 mL of PBS. Mix and dispense 100 µl into each well, cover the plate and incubate overnight at +4°C.



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4. Empty wells and wash once with 100  $\mu$ l of PBS.
5. Dispense 100  $\mu$ l of 2% skimmed dry milk in PBS into wells, cover and incubate for 2 hours at room temperature.
6. Empty wells by flicking the plate over a sink and tapping it on absorbent paper.
7. Wash plate once with PBS.
8. Dispense into wells 100  $\mu$ l of cell suspension containing the appropriate number of cells and appropriate concentration of stimulator. Cells may have been previously *in vitro* stimulated (Indirect ELISPOT). Cover the plate with a standard 96-well plate plastic lid and incubate cells at 37°C in a CO<sub>2</sub> incubator for an appropriate length of time (10-15 hours). **During this period do not agitate or move the plate.**
9. Empty wells by flicking the plate over a sink and gently tapping it on absorbent paper.
10. Distribute 100 $\mu$ l of PBS-0.1% tween 20 in wells and let sit for 10 min at +4°C.
11. Wash wells three times with PBS-0.1% tween 20.
12. For 1 plate dilute 100 $\mu$ l of reconstituted detection antibody into 10 mL of PBS containing 1% BSA. Distribute 100 $\mu$ l in wells, cover the plate and incubate 1 hour 30 min at 37°C.
13. Empty wells and wash three times with PBS-0.1% tween 20.
14. Distribute 100  $\mu$ l of Streptavidin-Alkaline phosphatase dilution (1/5000) in each well. Seal the plate and incubate for 1 hour at 37°C.
15. Empty wells and wash three times with PBS-0.1% tween 20. Remove all residual buffer by repeated tapping on absorbent paper.
16. Distribute 100 $\mu$ l of ready-to-use BCIP/NBT buffer in wells.
17. Let the reaction go for about 2-10 min at room temperature. Monitor spot formation visually.
18. Rinse wells three times with distilled water.
19. Dry wells. Read spots. Note that spots may become sharper after one night at +4°C.

Store the plate at room temperature away from direct sunlight.



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