



*Università di Messina*

*Dipartimento delle Specialità Chirurgiche*

*Sezione di Oftalmologia*

**CENTRO DI ECCELLENZA REGIONALE PER LE  
MALATTIE DELLA SUPERFICIE OCULARE**

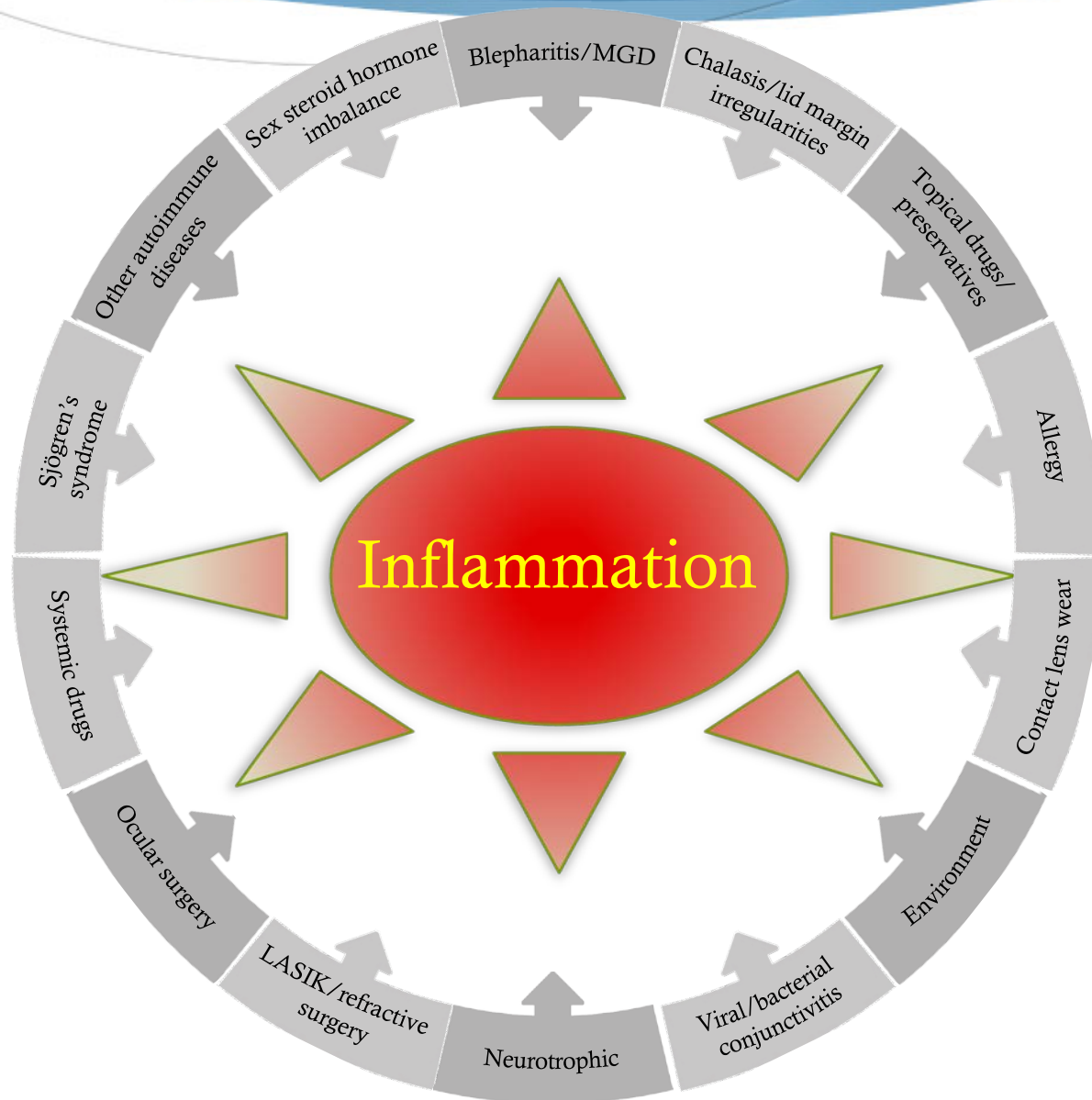
*Responsabile: Prof. P. Aragona*

# Inflammation Oculare nel Dry Eye

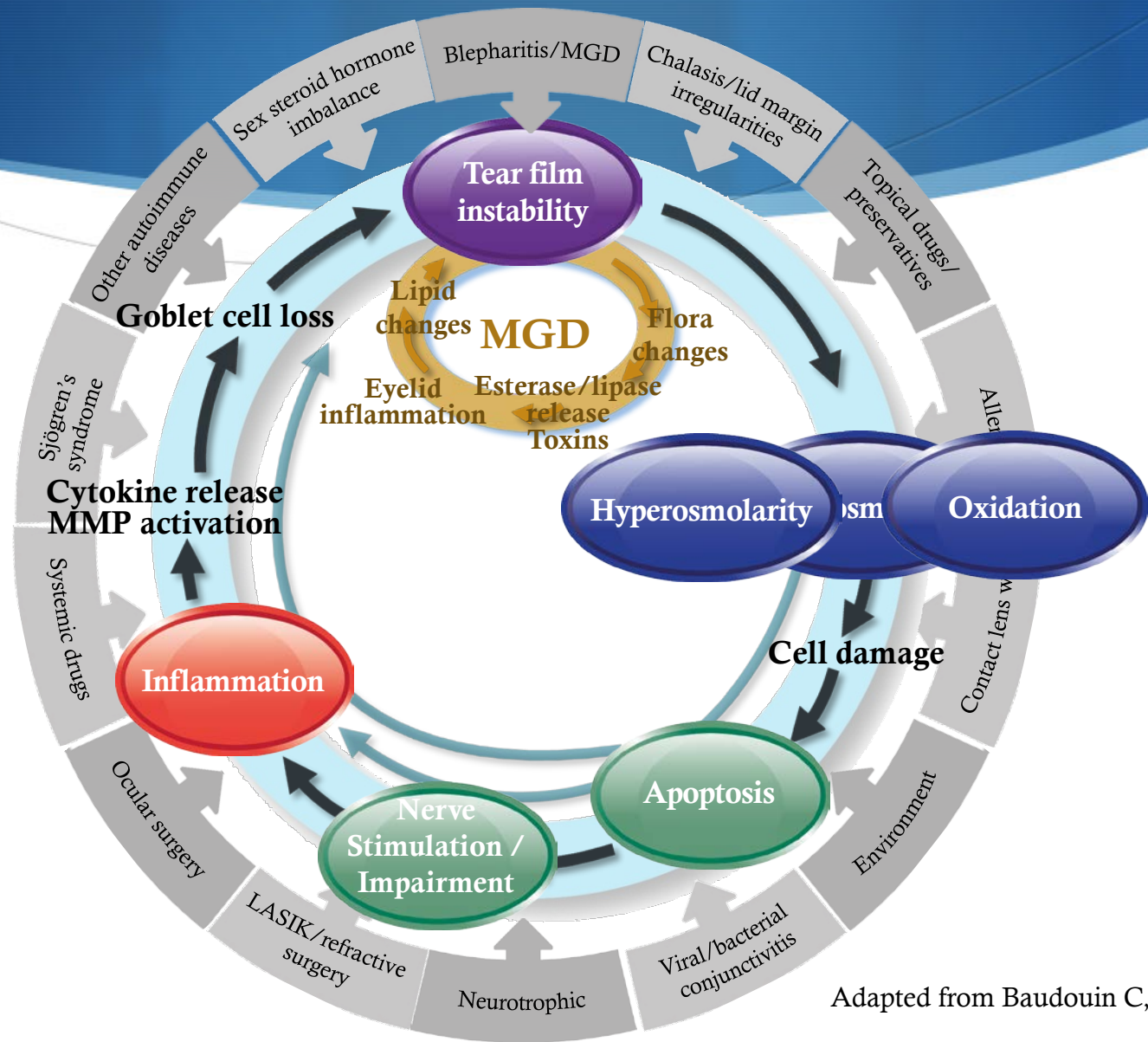
*Elisa Postorino*



# CAUSES OF INFLAMMATION



# Key Mechanisms of Dry Eye



**EXTERNAL NOXAE**

Hyperosmolarity, Infections,  
Oxidative stress, etc.



Epithelial  
Cells

**APOPTOSIS**



**SQUAMOUS  
METAPLASIA**

**INNATE RESPONSE**

**Inflammatory Mediators**

Signaling Molecules, Chemokines

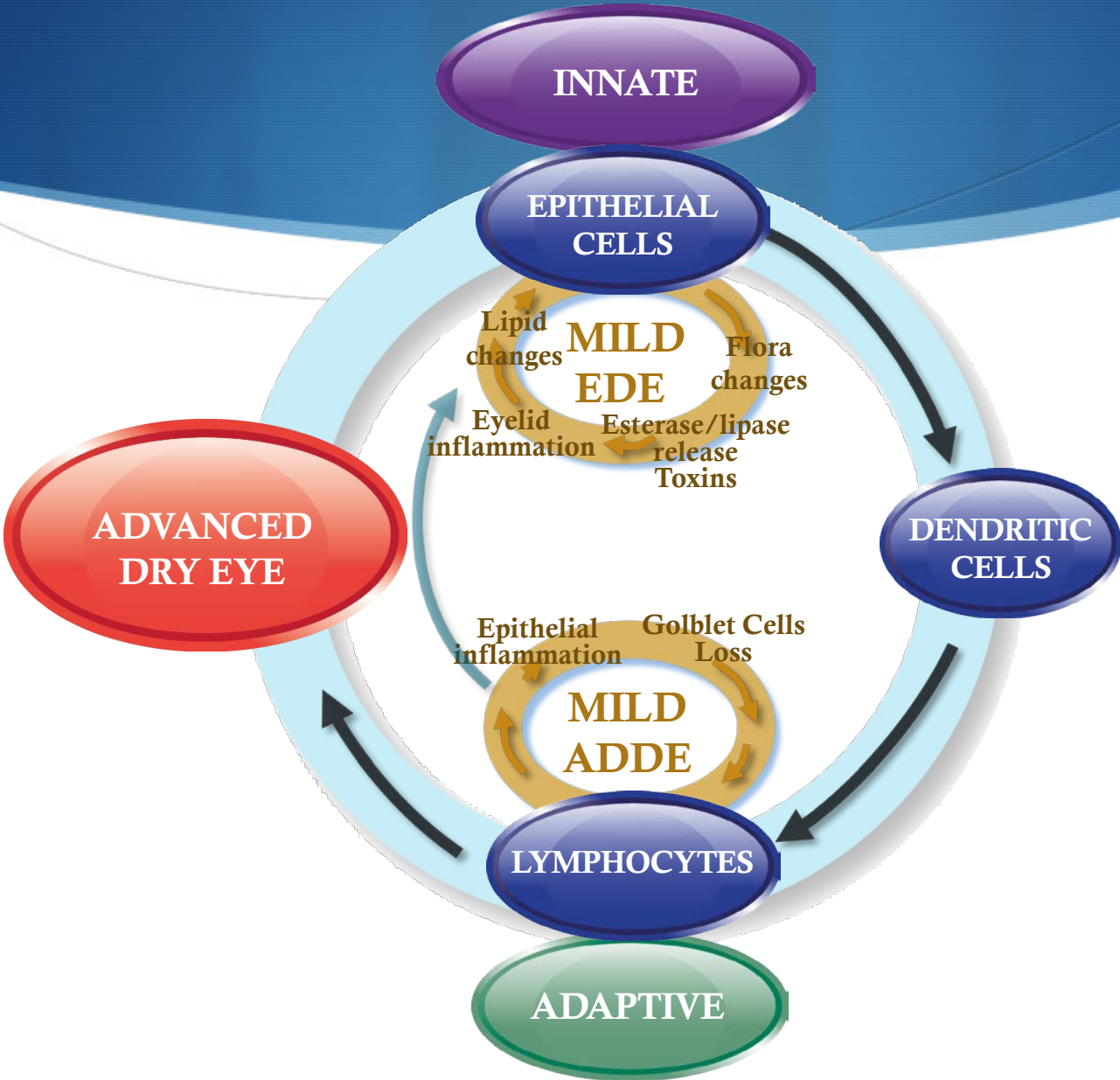
**ADAPTIVE RESPONSE**

APCs, Th1, Th17

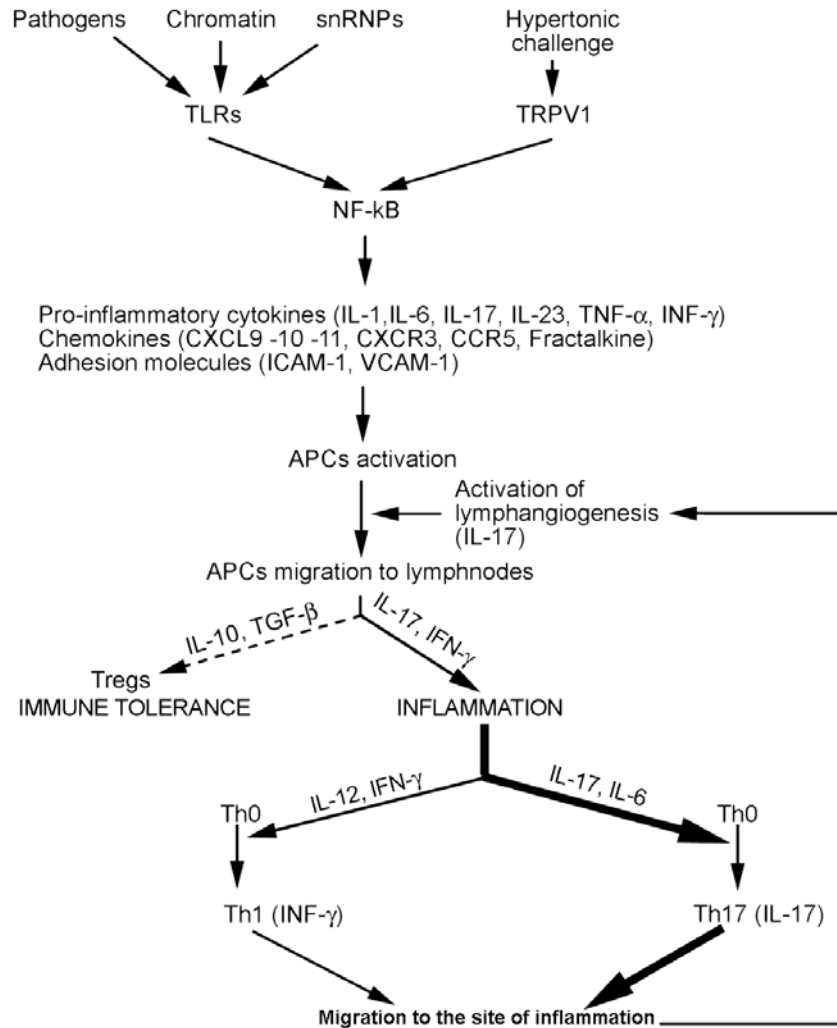
**OCULAR  
SURFACE  
INFLAMMATION**



# INFLAMMATORY MECHANISMS IN DRY EYE



# INFLAMMATION: FROM DEFENSE TO TISSUE DAMAGE



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## Defense Mechanisms

↓  
Acute Response/Irritation

↓  
Persisting Inflammation  
(Blepharitis, Allergy, etc.)

↓  
Chronic Inflammation

↓  
Tissue Damage

# CORTISOL PRODUCTION

```
graph TD; A[CORTISOL PRODUCTION] --> B[SYSTEMIC]; A --> C[LOCAL]; B --> D[Hypothalamic-Pituitary-Adrenal Axis]; D --> E[CORTISOL]; C --> F[11β-hydroxysteroid dehydrogenases (11β-HSDs)]; F --> G[CORTISOL];
```

**SYSTEMIC**

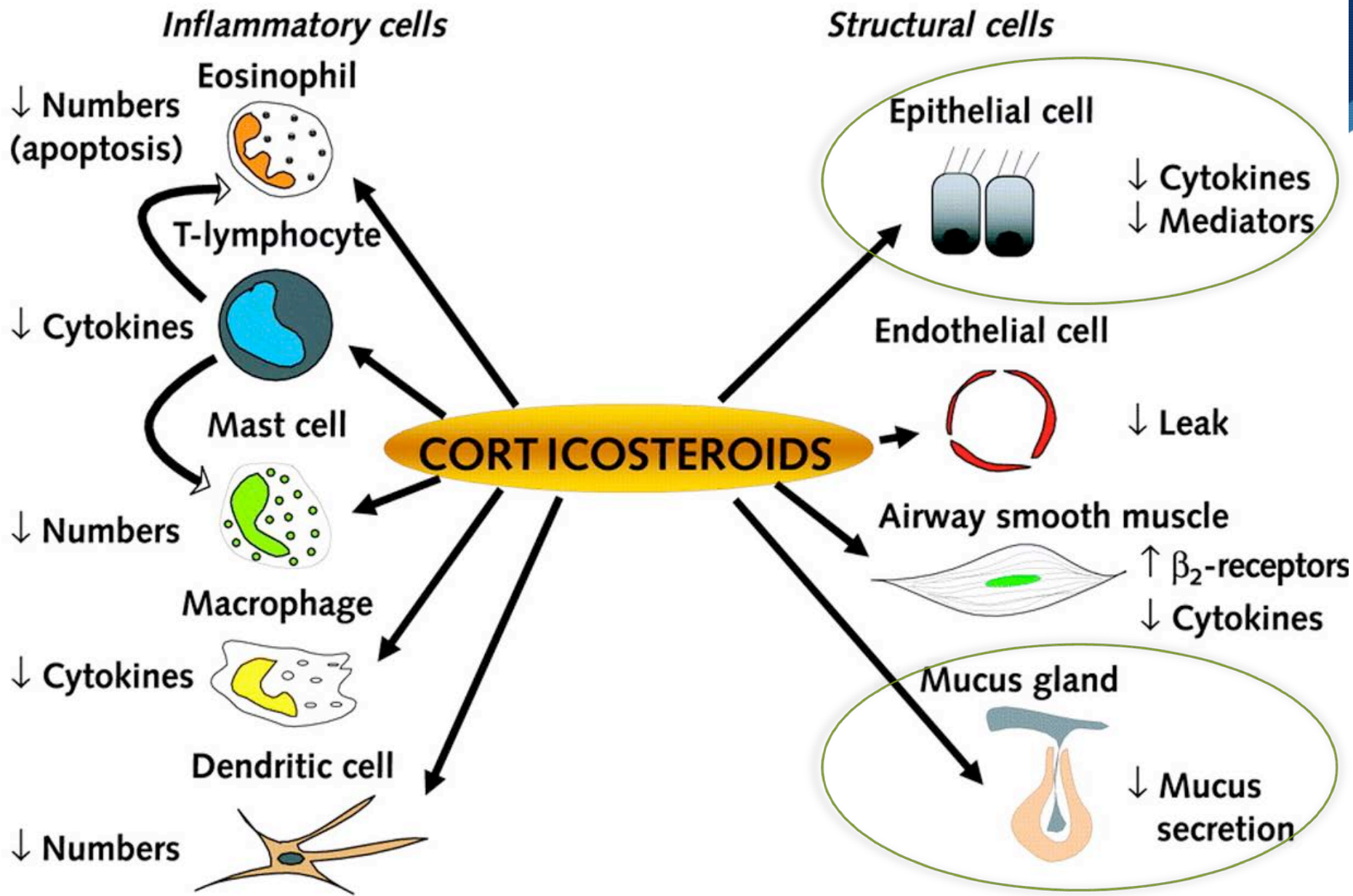
Hypothalamic-Pituitary-Adrenal Axis

**CORTISOL**

**LOCAL**

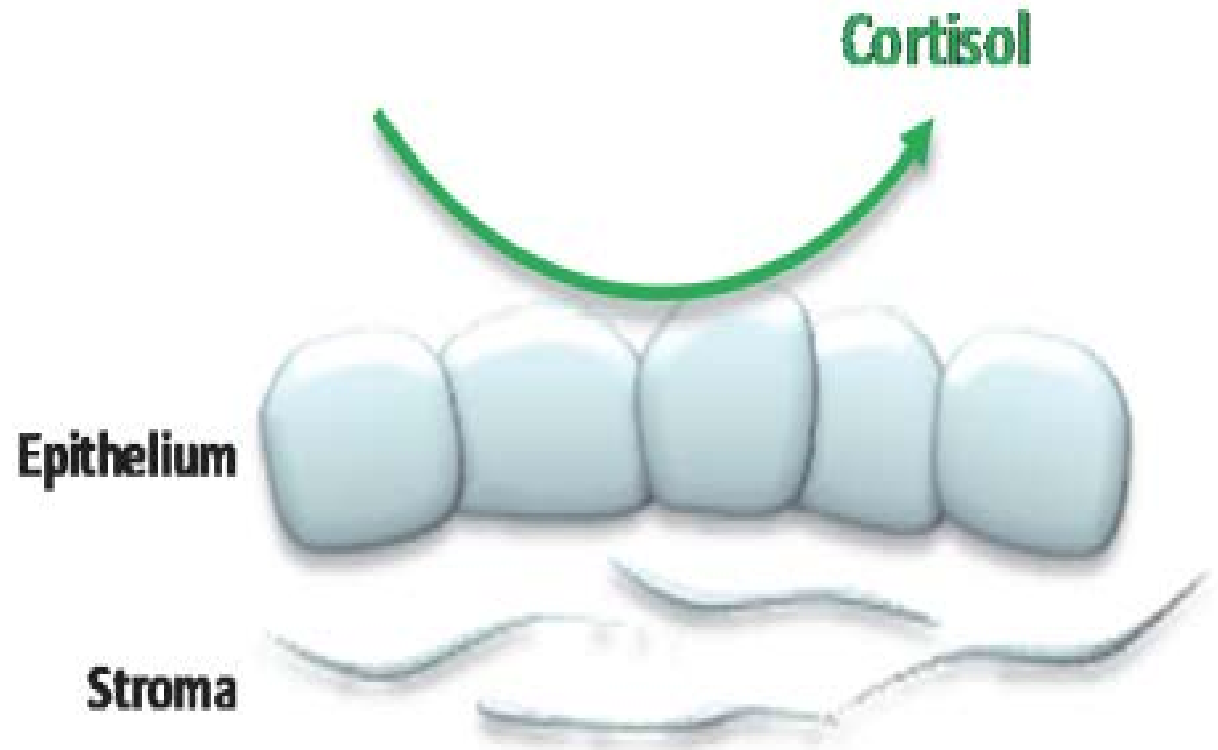
11 $\beta$ -hydroxysteroid dehydrogenases (11 $\beta$ -HSDs)

**CORTISOL**

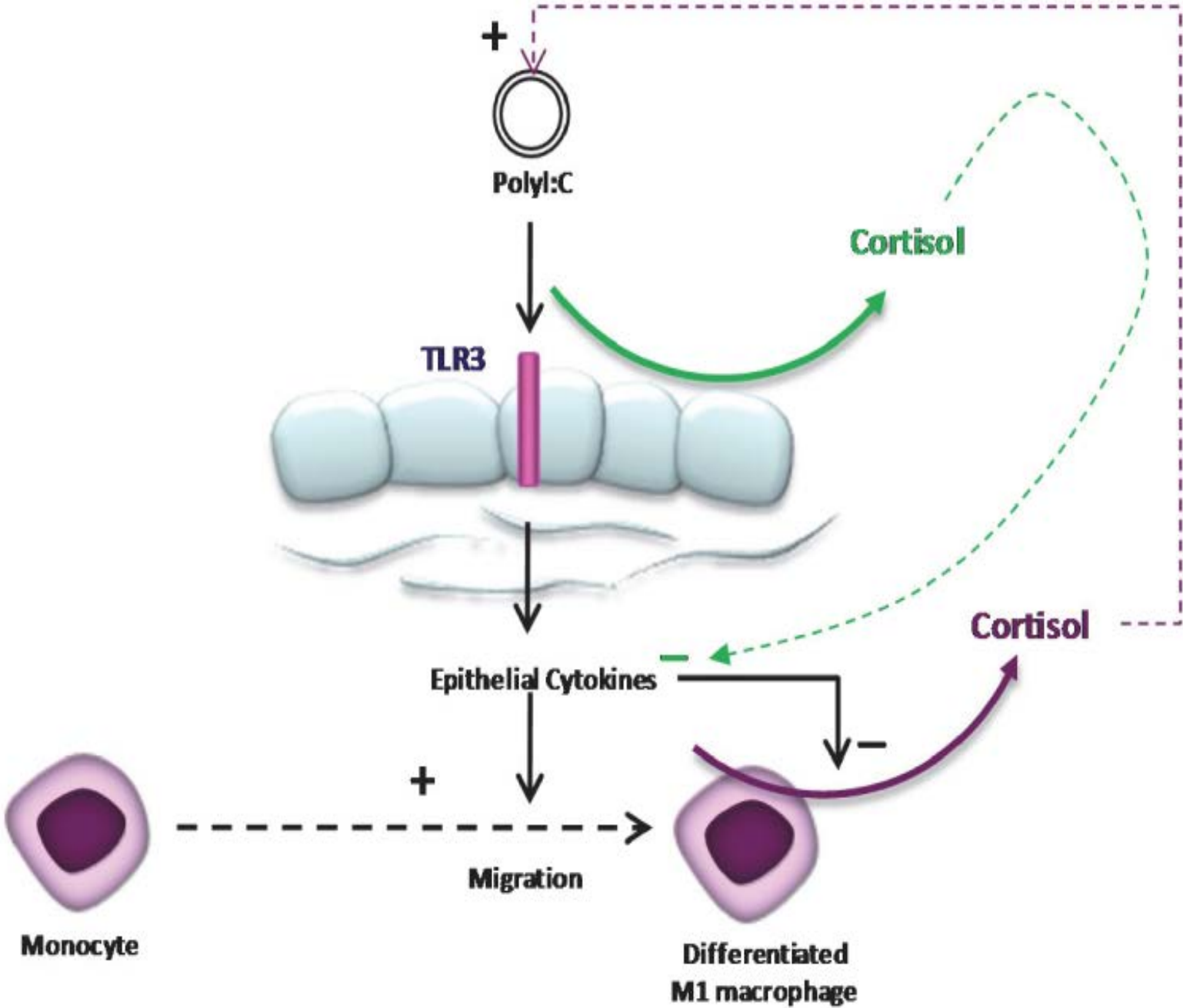




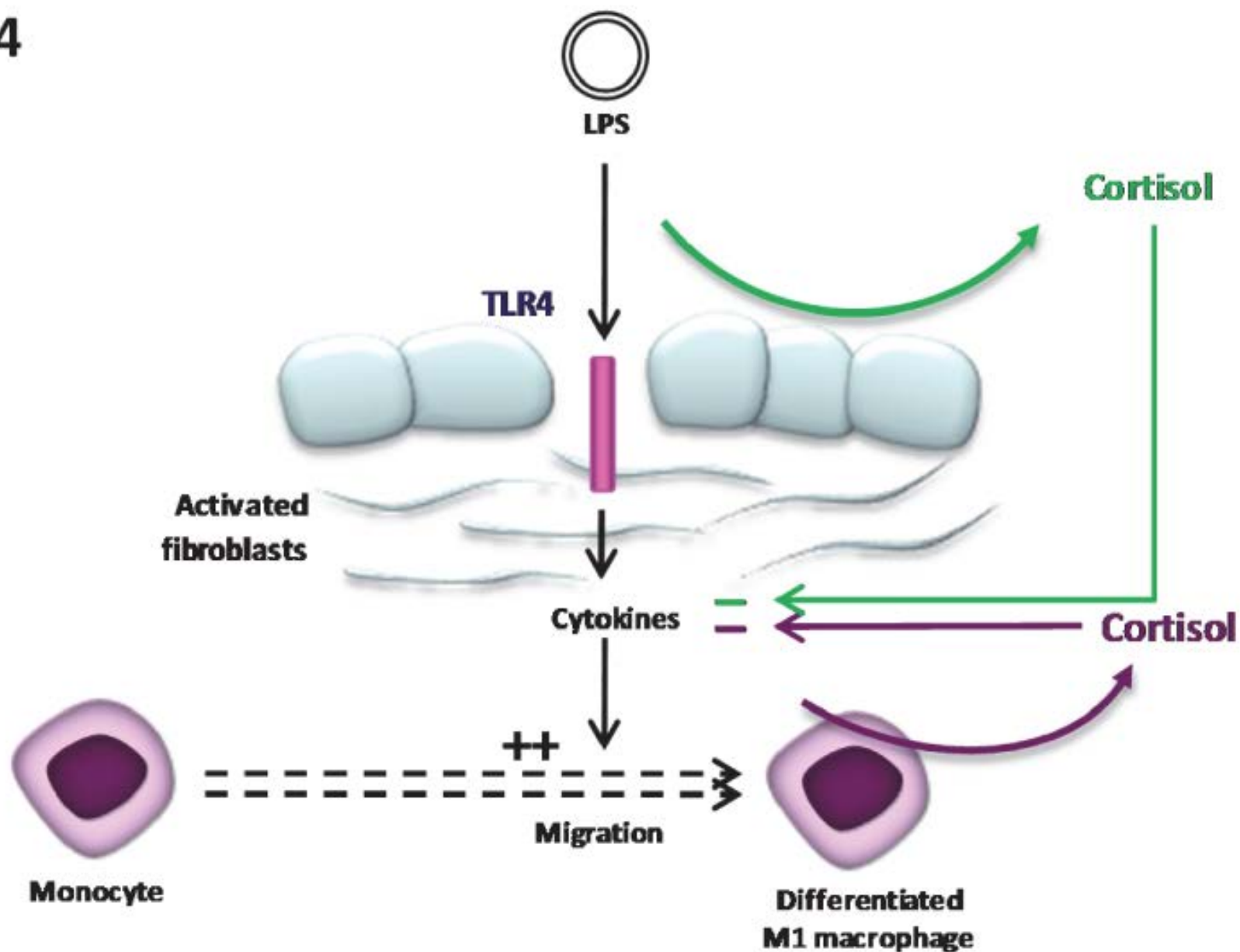
# A: Normal



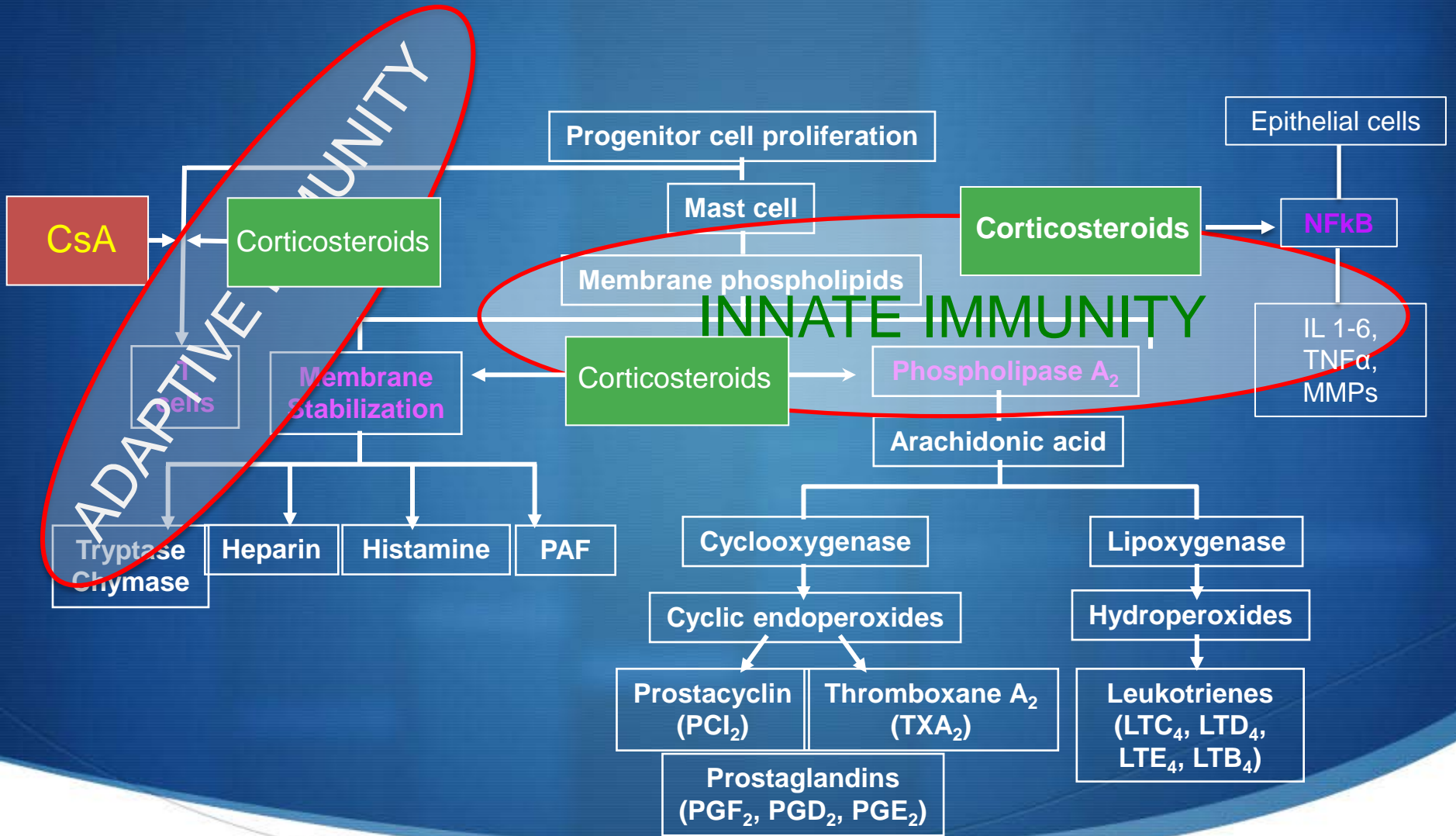
# B: TLR3



# C: TLR4



# Drugs Blocking the Inflammatory Cascade





# GOALS FOR INFLAMMATORY MOLECULES ASSESSMENT IN DRY EYE

- ◆ Differentiate among different forms of ocular surface disease
- ◆ Grade ocular surface disease severity

# HOW SHOULD WE TREAT THE INFLAMMATION OF THE OCULAR SURFACE?

## FIRST STEP:

**FAST TREATMENT OF  
INFLAMMATORY  
SOURCES**

USE HIGH DOSAGE  
ANTI-INFLAMMATORY  
AGENTS (i.e. SURFACE  
CORTICOSTEROIDS)

## SECOND STEP:

**CONTROL  
INFLAMMATORY  
SPIKES**

DECREASE ANTI-  
INFLAMMATORY  
AGENTS

## THIRD STEP:

**MAINTAIN  
INFLAMMATION  
REDUCTION**

USE Milder/LONG  
TERM ANTI-  
INFLAMMATORY  
AGENTS

# Conclusion

- Dry eye is an inflammatory disorder
- A better knowledge of disease mechanisms may lead to identify further diagnostic markers and therapeutic targets
- Cortisol is a natural anti-inflammatory molecule, that can be used for a long term treatment of ocular surface inflammation



**GRAZIE PER L' ATTENZIONE**