# Artificial Immune System

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# Introduction

- B-lymphocytes: possess receptors, produce antibodies
- T-lymphocytes: More diversified
  - Only helper T-cells relevant in B-cell reaction
- Receptors: sensors on B-cell surface
- Antigen: structure that causes an immune response
- Antibody: neutralizes pathogens; unique to an antigen
- Each B-cell can produce antibodies of a single variety

# Clonal Selection

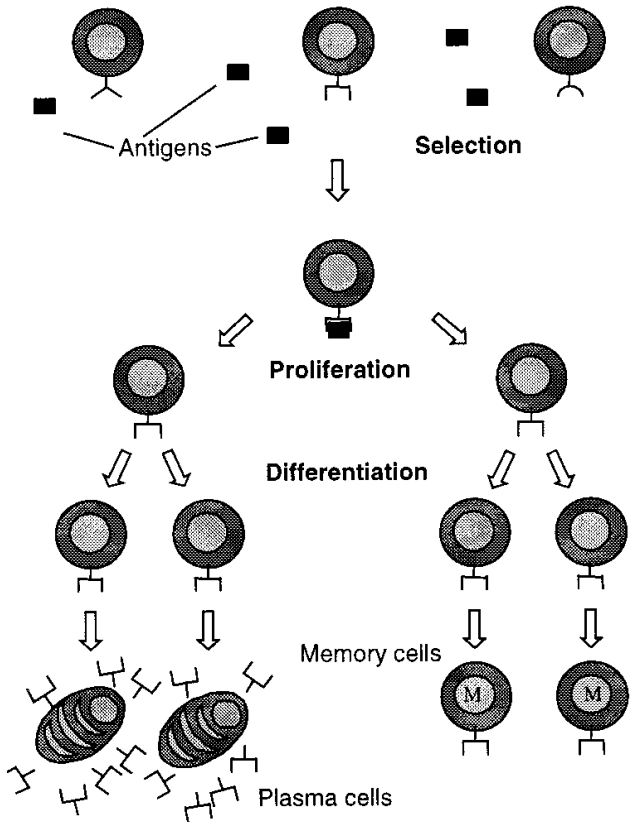


Figure : Clonal Selection Principle

# Affinity Maturation

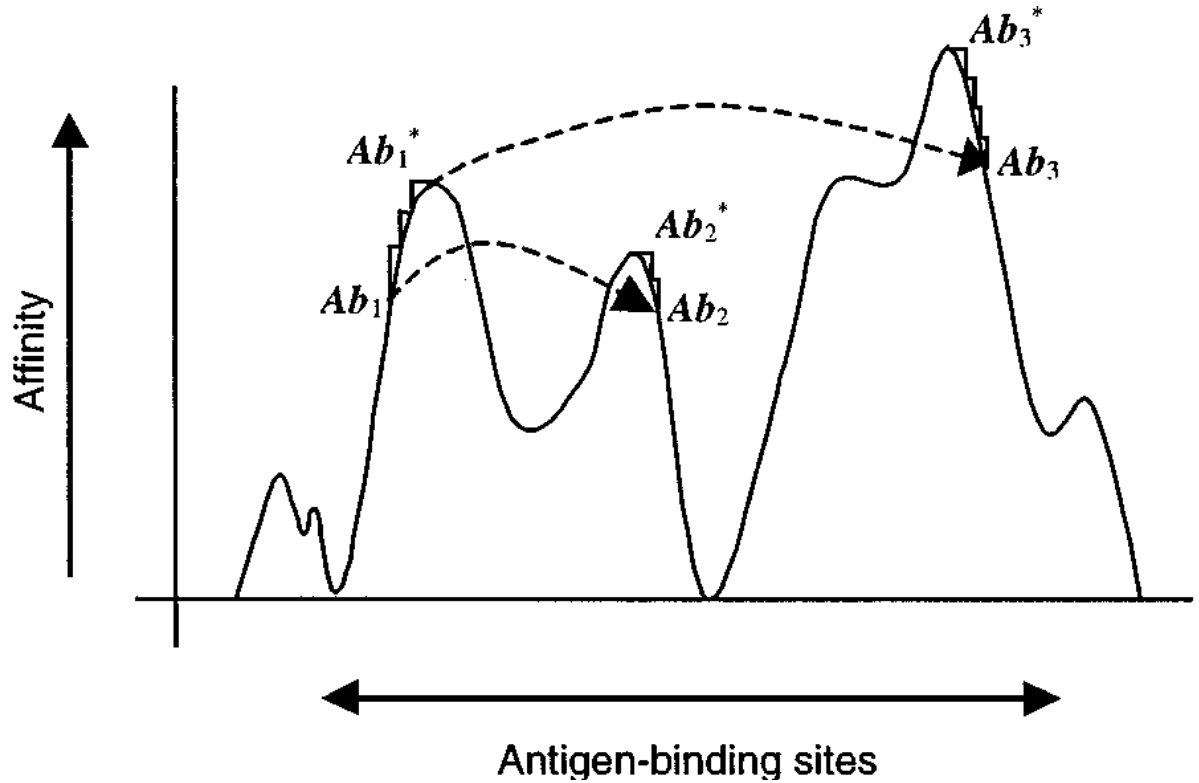


Figure : Affinity Maturation

# Response Efficacy

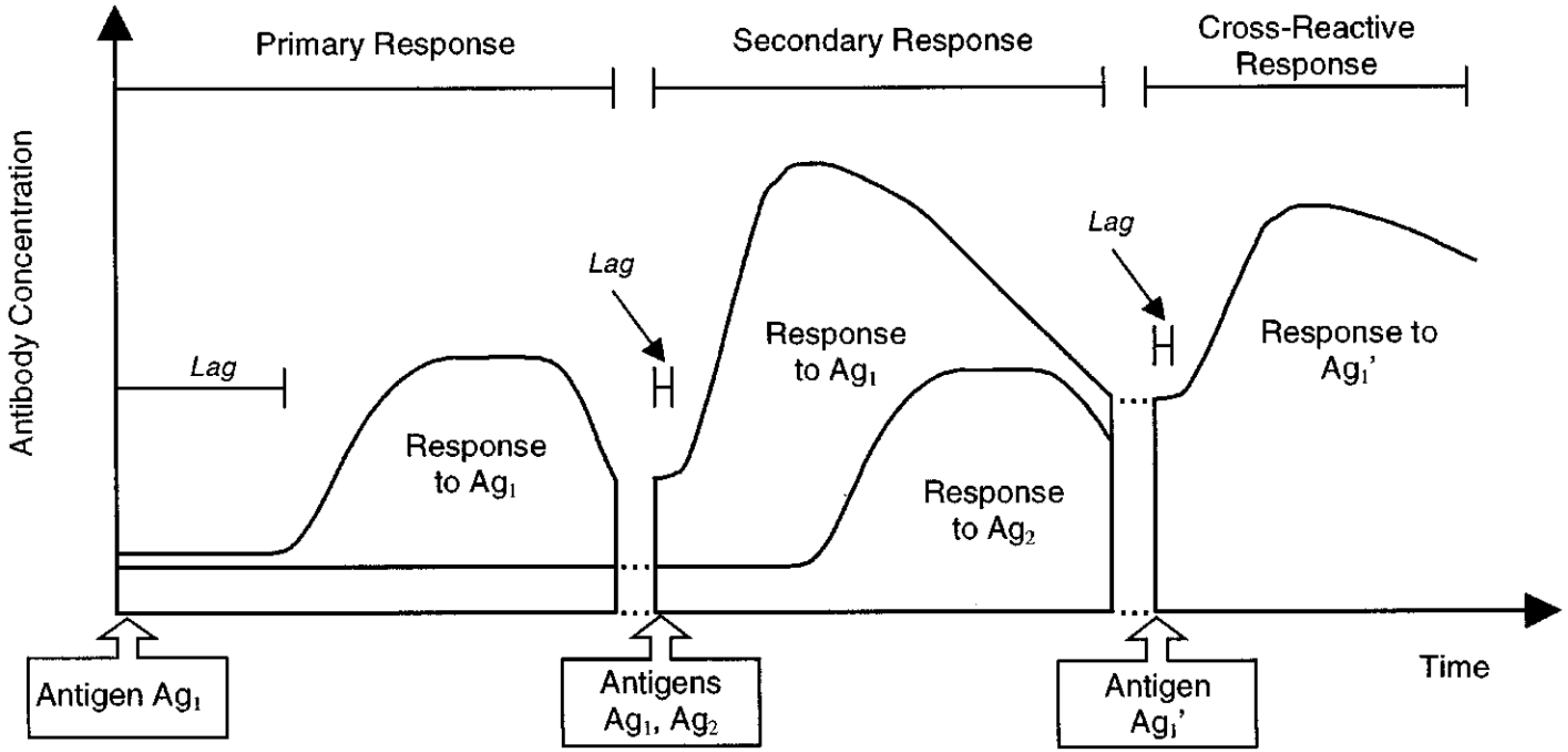


Figure : Antibody Concentration

# Shape-space Model

- Model for interaction between Ag and Ab[2]
- Ag's and Ab's are points in $S^l \subseteq \mathbb{R}^l$
- Distance measure used to calculate the degree of interaction

# CLONALG - Immune Aspects

1. Maintenance of a specific memory set
2. Selective cloning of the most stimulated Ab's
3. Death of nonstimulated Ab's
4. Affinity maturation
5. Reselection of the clones proportionally to their antigenic affinity

# Possible Applications

- Disease diagnosis [4]
- Modelling disease behaviour in different conditions
- Intrusion detection [1]


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