5th European Biosimilars Congress

June 27-29, 2016, Valencia, Spain

Immunogenicity of Biosimilars

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Abstract

A biosimilar is a biological medicinal product which is similar to authorized biological medicine (reference medicinal product). There are many factors which contributing to immunogenicity includes: The first, product related factors which include structural properties such as sequence for protein ,presence of exogenous or endogenous epitopes ,degree of glycosylation, second, host related factors, such as the genetic predisposition of a patient, the genetic sequence that encoding for endogenous equivalent of the therapeutic protein, concomitant illnesses, and dose and route of administration. Many methods used for measuring of immunogenicity, Radio immuno precipitation assay (RIPA),Direct ELISA, Bridging ELISA, and others.

Background

A biosimilar is a biological medicinal product which is similar to authorized biological medicine (reference medicinal product).A biosimilar and its reference product are expected having the same safety ,efficiency profile, and are generally used for treating the same conditions.

Methods

Most biopharmaceuticals induce immune responses (immunogenicity).The immune response for exogenous protein products derived from non-human origin, induce neutralizing antibodies mediated by T cells. Endogenous proteins of human origin leads to binding antibody, mediated and by B-cells.

Unintended Immune responses: includes anaphylaxis, organ-specific immunopathy, autoimmune reactions, and systemic hypersensitivity. These immunogenicity due to altering in pharmacodynamics, pharmacokinetics, and certain immunopathies

Immunogenicity related factors:

1- product-related factors:

A-Structural properties: **(1)** Protein sequence ,**(2)** Presence of exogenous or endogenous epitopes **,(3)** Degree of glycosylation influencing protein degradation **(4)** Exposure of antigenic sites and solubility.

B- Formulation and storage, downstream processing .

C- Level of impurity or presence of contaminants

2- Host related factors:

a- The genetic predisposition of a patient may influence the production of neutralizing Antibody.

b-The genetic sequence encoding the endogenous equivalent of the therapeutic protein

c-Concomitant illnesses, particularly the kidney and liver, may influence immunogenicity.

d-Dose and route of administration are important determinants.

Immunogenicity assessment depended on:

A-Nature of immune response

B-The clinical reverence and severity of consequences.

C-The incidences of immune responses

D-The population being studied

Measuring for immunogenicity:

a- Radio immunopercipiation assay (RIPA)
b-Direct ELISA , **c**- Bridging ELISA

d-Electrochemical luminescence assay

e-Surface Plasmon resonance

Results

1- Most biopharmaceuticals induce immune responses (immunogenicity). Many factors effects on immunogenicity includes : product and host related factor.

3-Immunogenicity assessment depend on nature, incidence, clinical reverence and population being studied

3- Measuring for immunogenicity by ELISA, RIPA, and others

Conclusions

Study of immunogenicity for Biosimilars is very important step for safety

References

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