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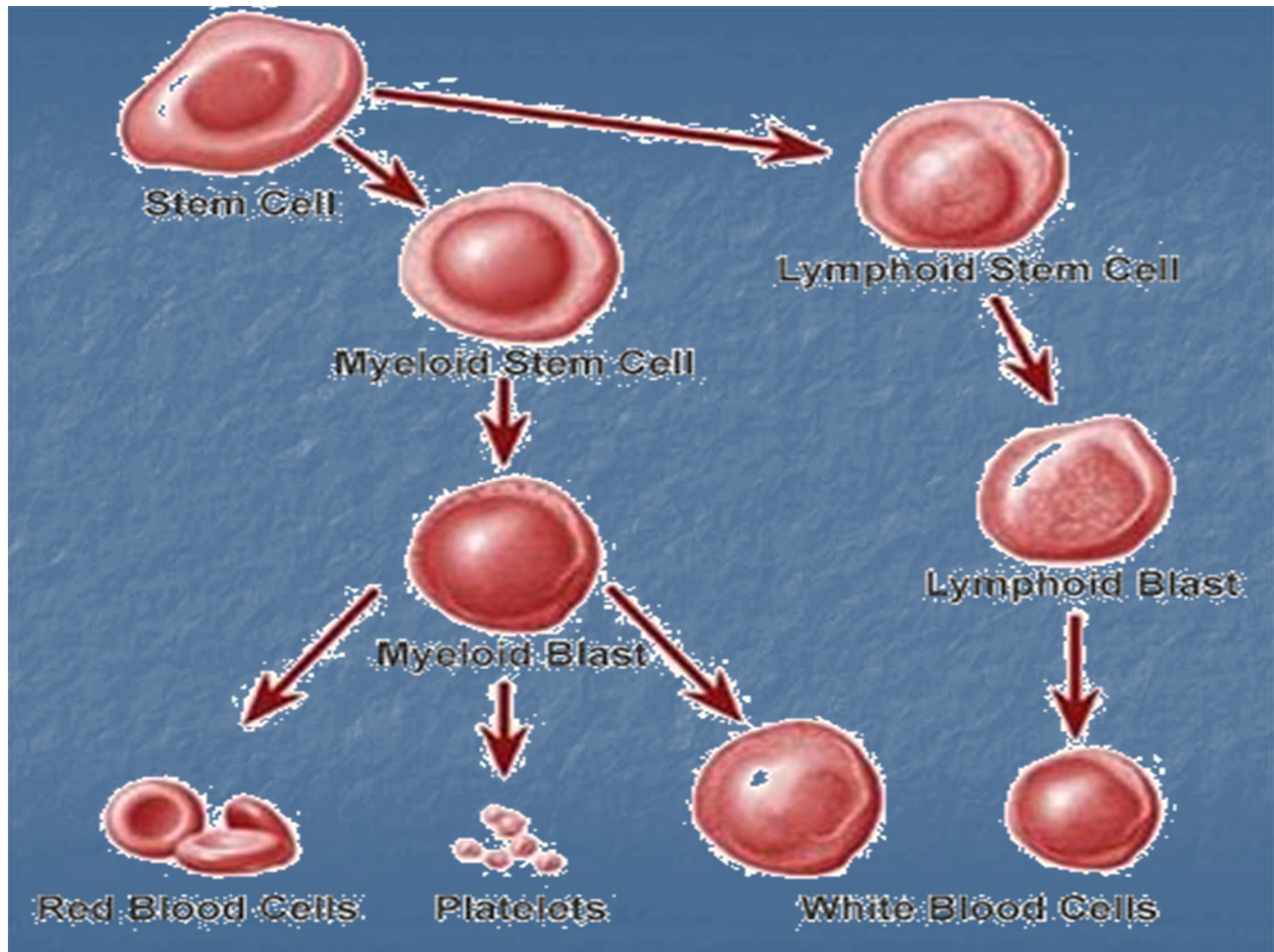
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**Expression of CD₉₅ in Acute
Lymphocytic Leukemia (ALL) in
Egyptian Children before and after
Treatment**



Leukemia

- It's is the term used for cancer that affects the blood cells.
- Marrow-based neoplasm composed predominantly of minimally or partially differentiated lymphoid precursors.



- **The malignant disorder resulting from the clonal proliferation of lymphoid precursors with arrested maturation is known as**

Acute Lymphocytic Leukemia

- **It is the most common type of Leukemia found in children that's why it is commonly called childhood leukemia.**

Apoptosis

(Programmed cell death)

- **Controlled cellular self-destruction.**
- **Regulation of normal cell growth is balanced between cell proliferation, cell differentiation and apoptosis, a disruption of this balance is thought to be an important event leading to carcinogenesis.**
- **Apoptosis induction is the target of most chemotherapeutic drugs.**

Regulation of apoptosis

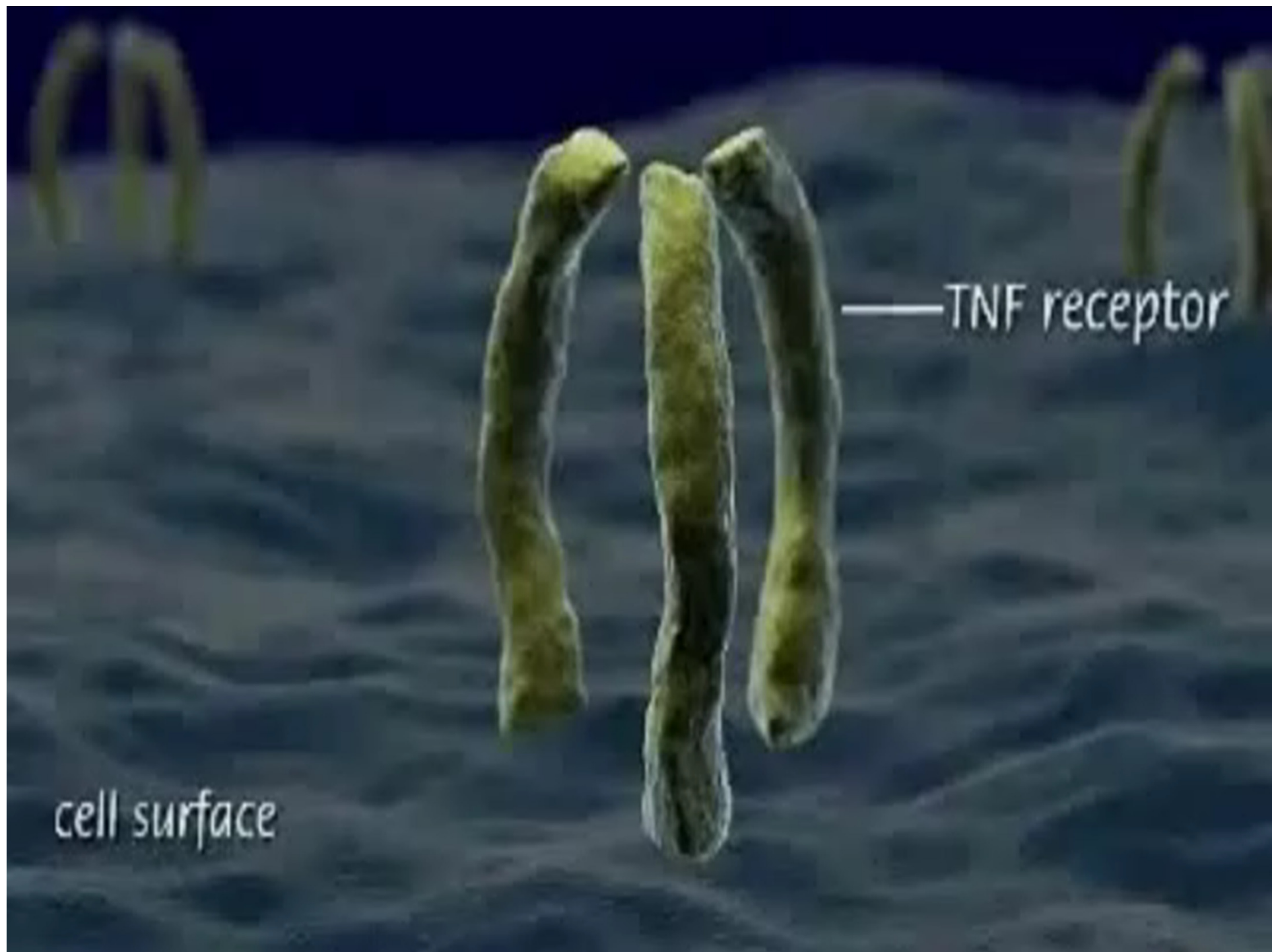
CD₉₅

(Fas, Apo-1)

- **Pro- apoptotic protein.**
- **Cross linking of Fas by its ligand (Fas L)**



Apoptosis

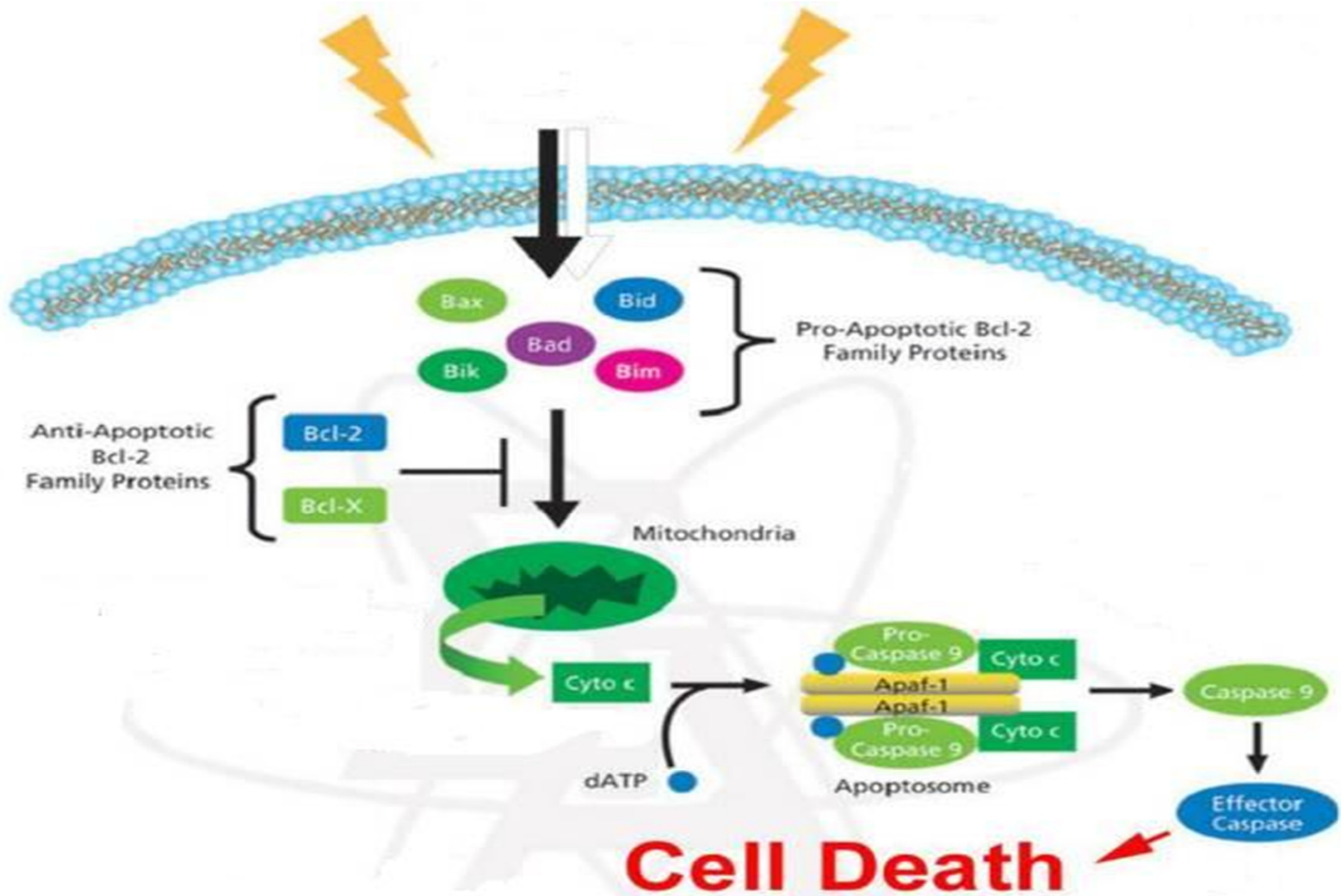


— TNF receptor

cell surface

Bcl-2

- It is located within the mitochondrial membrane, endoplasmic reticulum and nuclear envelope.
- Bcl-2 family of proteins :-
Bax , Bcl-2





Bcl-2 proteins
& apoptosis

Treatment protocol for childhood ALL

Total XV (Pui et al., 2004)

**The induction phase
(6-7 weeks)**

VCR, DOX, Prednisone,
Ara C, 6-MP, Cyclo, ASP
Ith (MTX, Ara C,
hydrocortisone)

**The consolidation phase
(8 weeks)**

HD-MTX , 6-MP

**The maintenance phase
(120 weeks)**

DEX, VCR, DOX, 6-MP, ASP, Ith, MTX, Cyclo, Ara-C.

Nutritional status of children with ALL

Zinc

- Zinc is found in almost every cell of the body.
- It stimulates the activity of approximately 100 enzymes.

Copper

- It forms complexes with metalloenzymes with oxidase activity.

Aim of the work

Identify the changes occurring in newly diagnosed ALL children regarding the expression of *CD₉₅* receptor and blood level of *Bcl-2* as markers of apoptosis as well as serum *zinc* and *copper* levels prior to and during the maintenance phase of the specified treatment protocol.

Subjects and Methods



```
graph TD; Subjects([Subjects]) --> Group1([Group 1]); Subjects --> Group2([Group 2]); Subjects --> Group3([Group 3]);
```

Subjects

Group 1

**Ten normal
healthy children**

Group 2

**Twenty five pediatric
patients newly
diagnosed of acute
lymphocytic
leukemia**

Group 3

**Twenty treated
patients**

Experimental Design

Routine laboratory investigations

```
graph TD; A([Routine laboratory investigations]) --> B[Complete blood count (CBC)]; A --> C[Hemoglobin concentration]; A --> D[Bone marrow blast count]; B --> E[Total leukocyte count]; B --> F[Platelet count];
```

**Complete
blood count
(CBC)**

**Hemoglobin
concentration**

**Bone marrow
blast count**

Total leukocyte count

Platelet count

Sampling

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graph TD; Sampling([Sampling]) --> Blood([Blood]); Sampling --> Serum([Serum]);
```

Blood

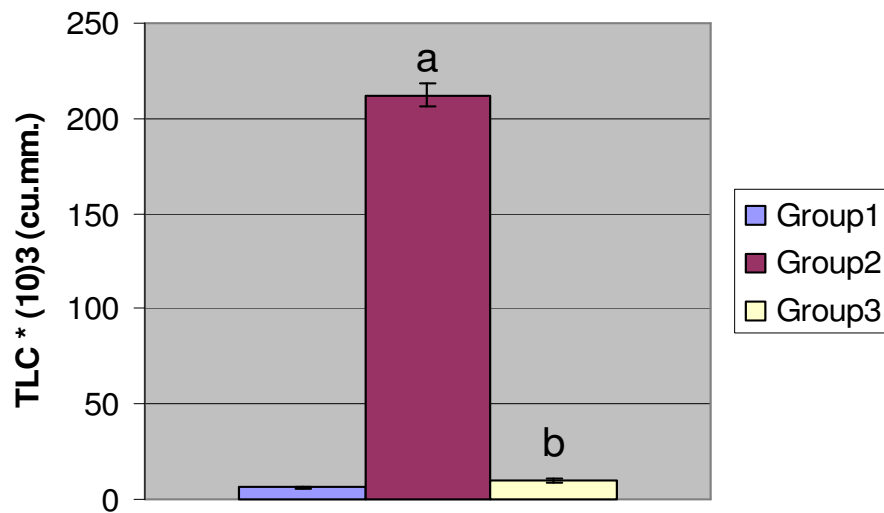
- **Determination of CD₉₅ % using Flowcytometer**
- **Determination of Bcl-2 Concentration using ELISA**

Serum

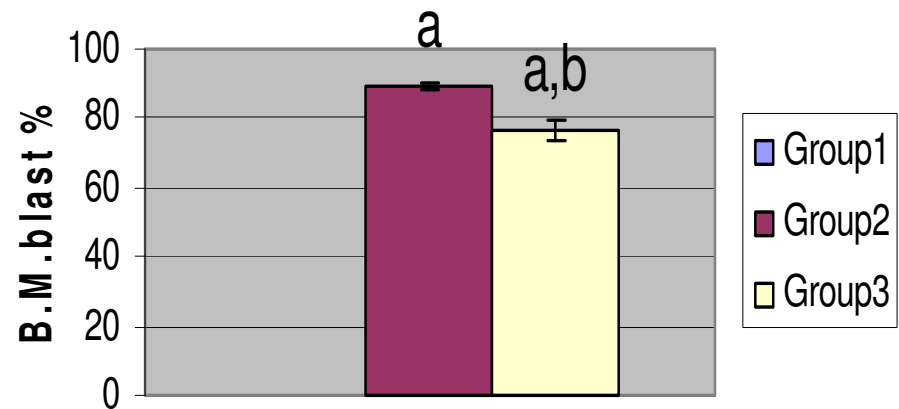
- **Determination of zinc and copper levels using atomic absorption spectrophotometer**

Results

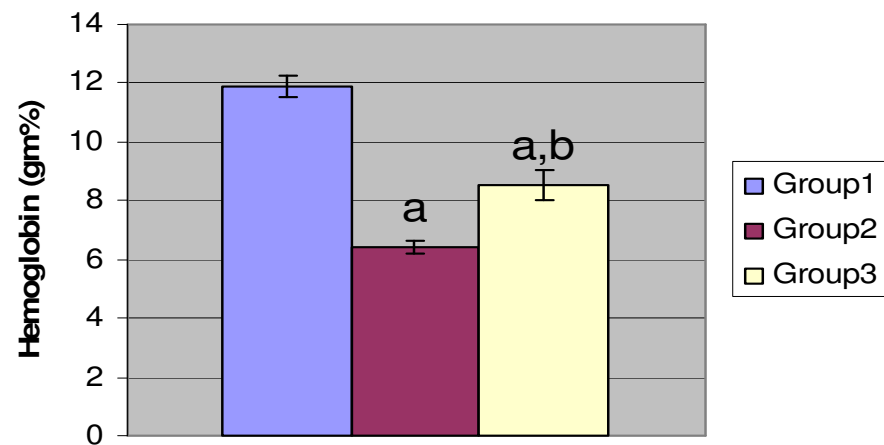
Total Leukocytic count (TLC) in groups 1,2 and 3.



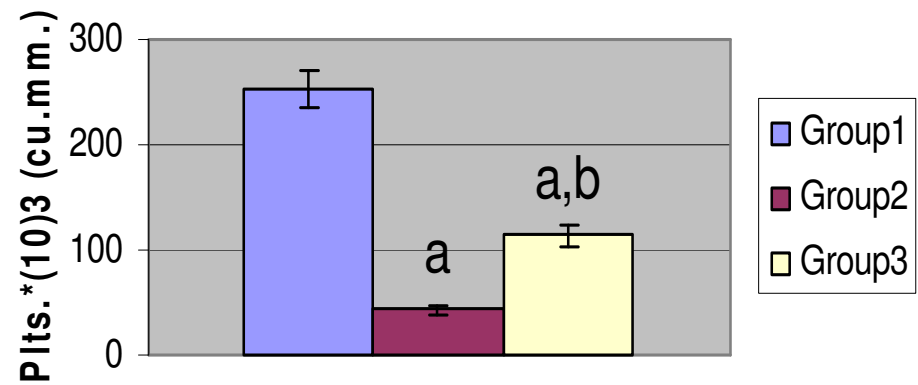
Bone marrow blast count (B.M.blast) in groups 1,2 and 3.



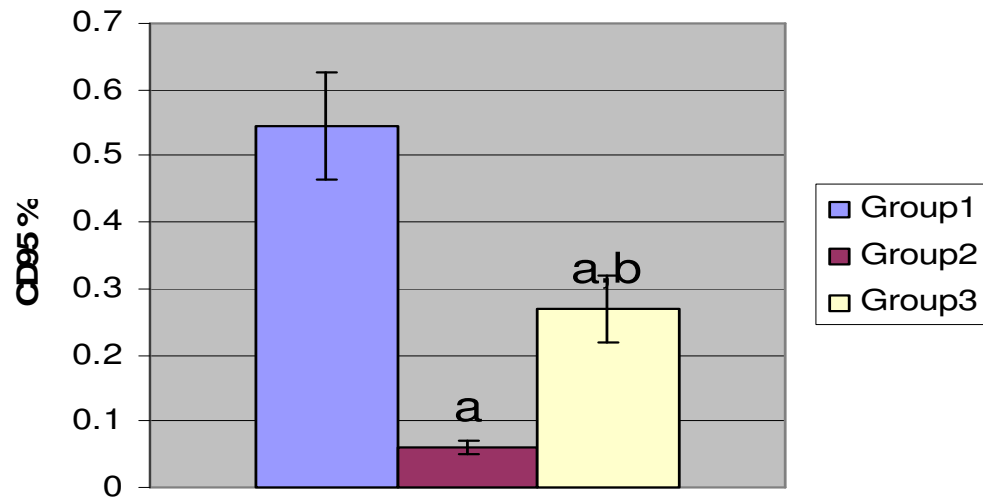
Hemoglobin concentration in groups 1,2 and 3.



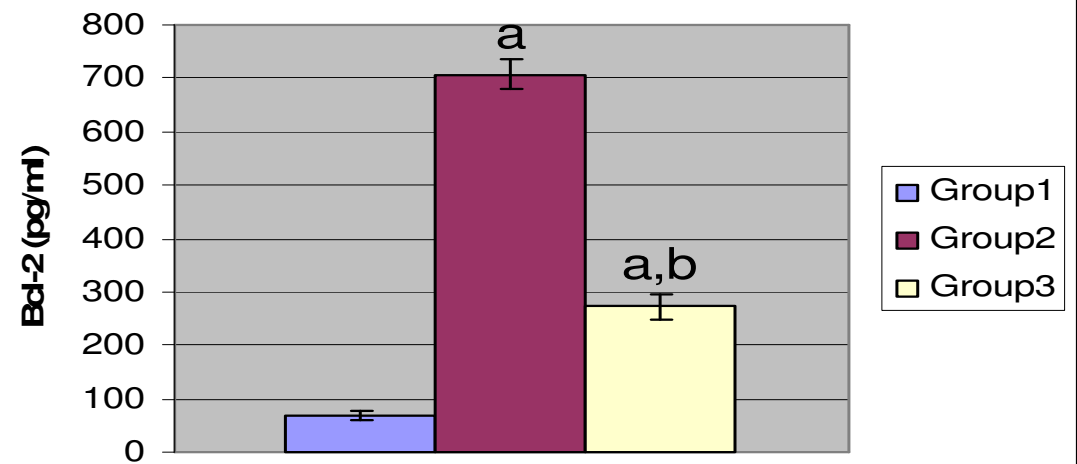
Platelet count (Plts) in groups 1,2 and 3.



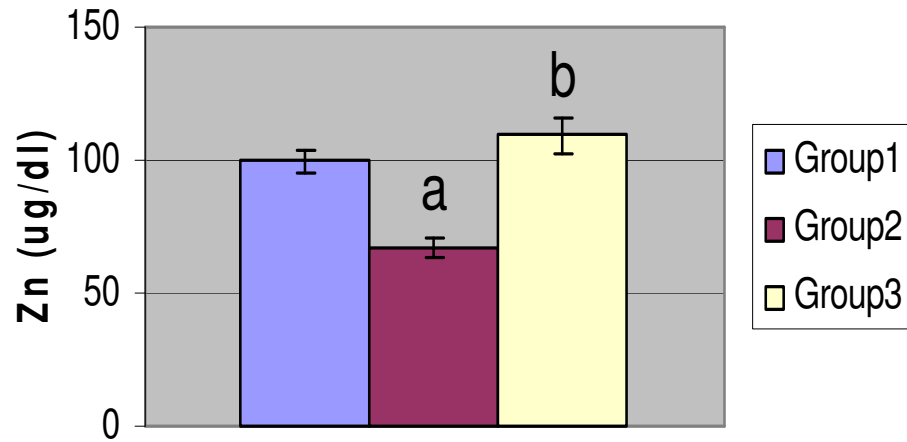
CD95 % in groups 1,2 and 3.



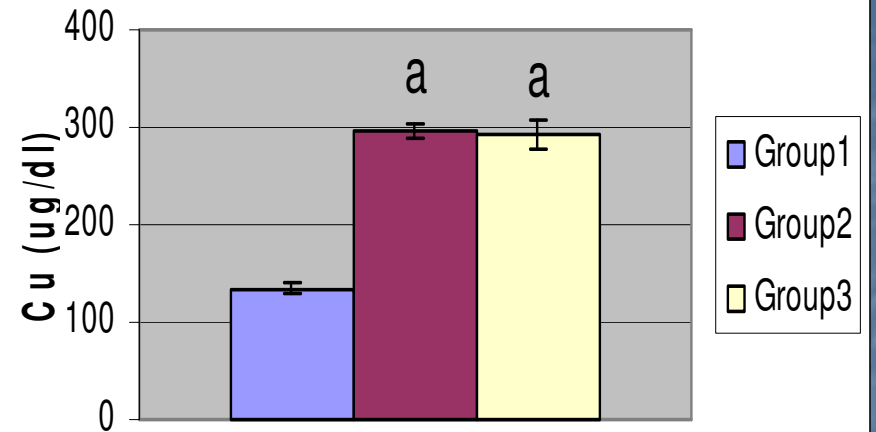
Bcl-2 concentration in groups 1,2 and 3.



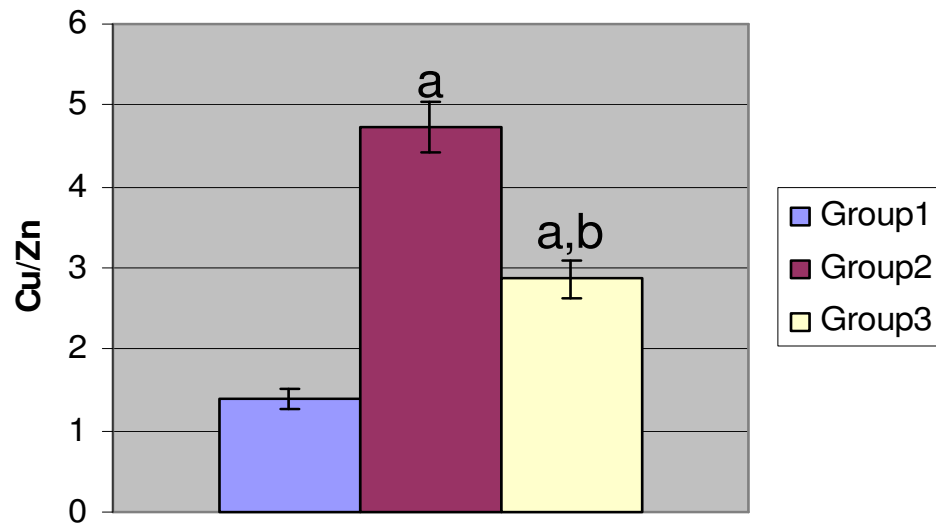
Serum Zn levels in groups 1,2 and 3.

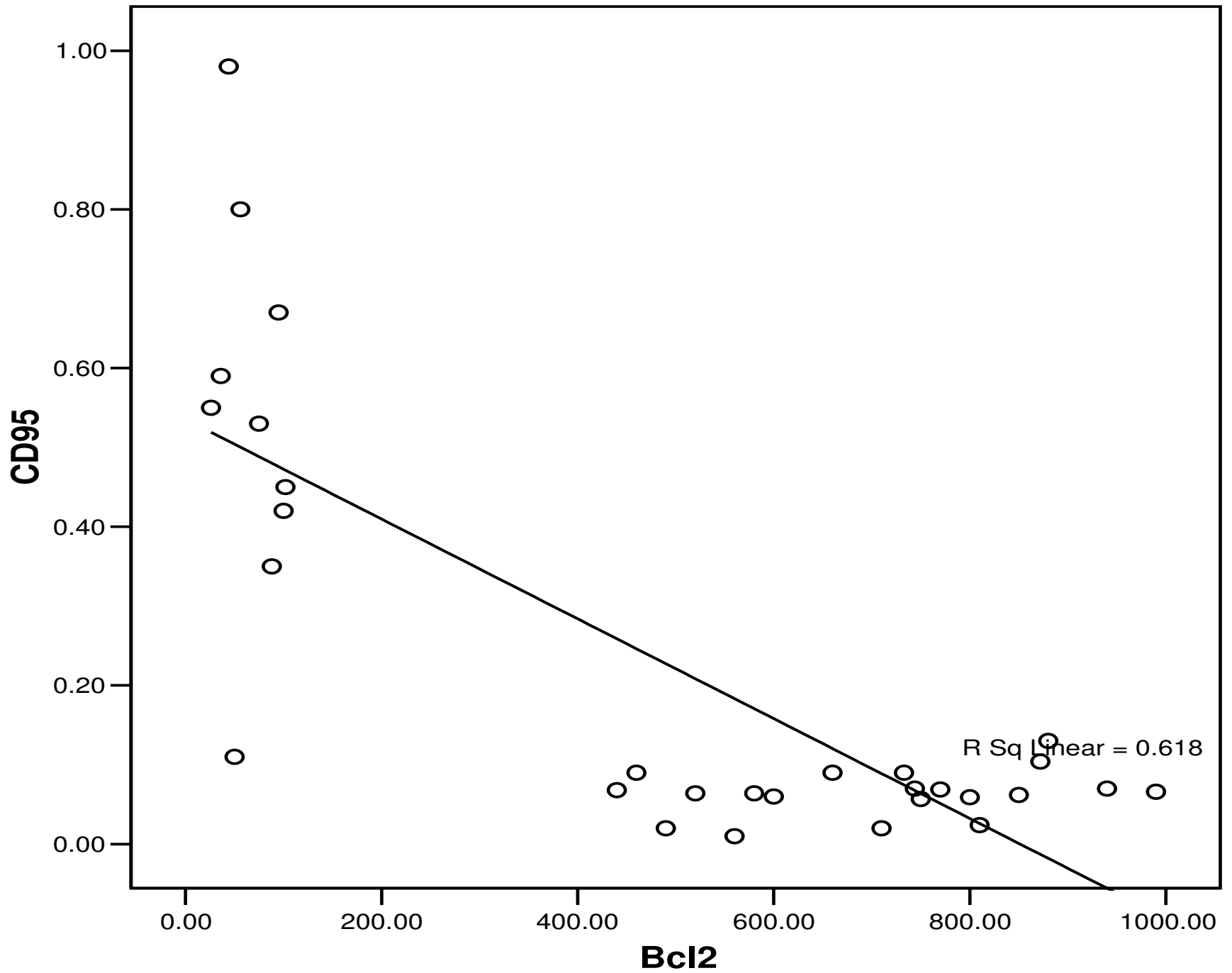


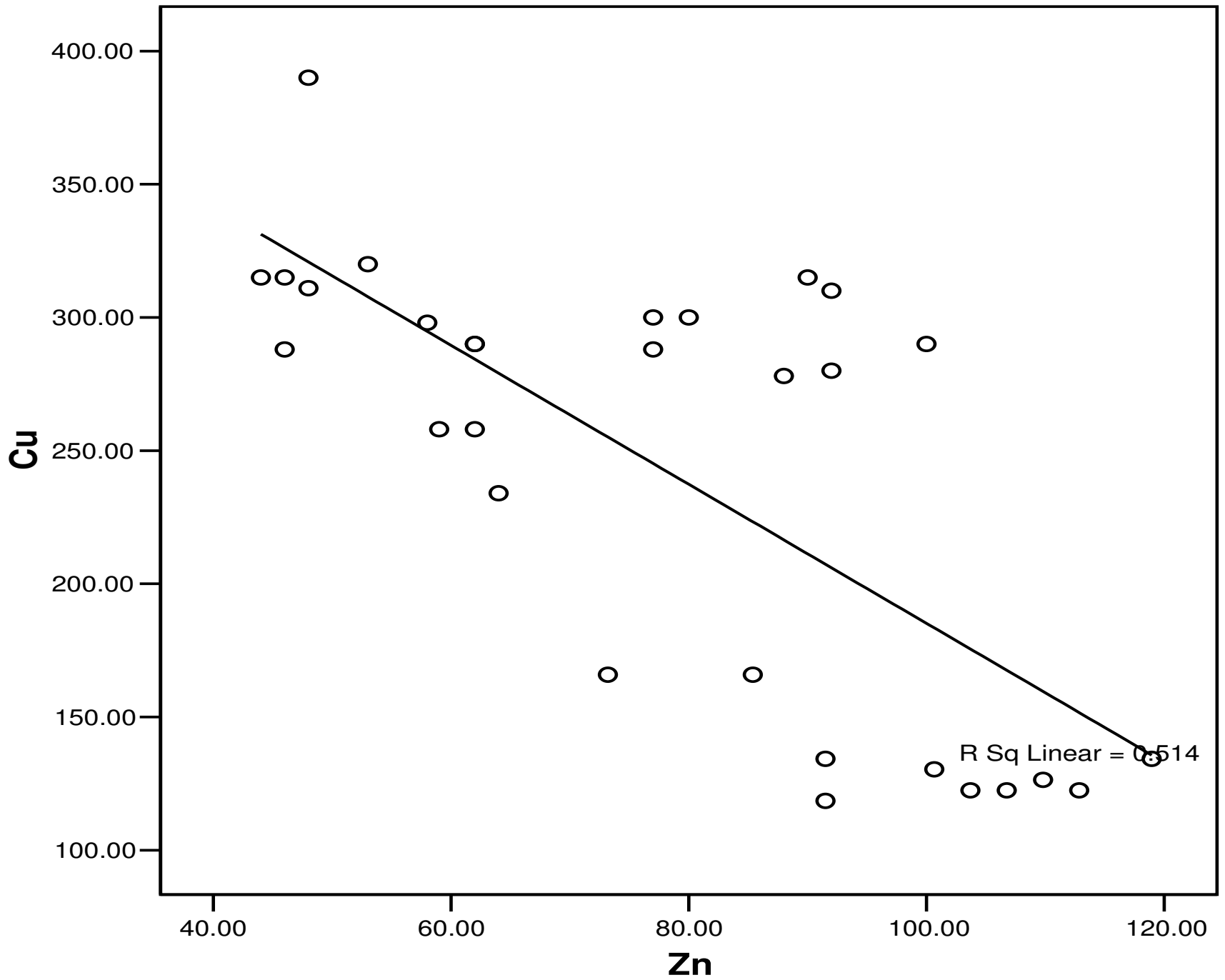
Serum Cu levels in groups 1,2 and 3.



Cu/Zn in groups 1,2 and 3.







Conclusion

- The current study demonstrated that both *CD₉₅ %* and *Bcl-2* protein are useful diagnostic markers that may help not only in diagnosis but also in follow up of ALL cases.

Recommendations

- **Long-term studies with large number of cases are still needed.**
- **Avoiding chronic zinc deficiency should be taken into consideration in the prevention of childhood leukemia.**

Thank You