

# The Effect of Wharton's Jelly Mesenchymal Stem Cells conditioned medium on Squamous Cell Carcinoma Cell Line

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## Introduction and Review of Literature:

Head and neck squamous cell carcinoma (HNSCC) accounts for over 90% of all head and neck cancers and represents the sixth most common cancer worldwide. Patients diagnosed with HNSCC have a 60% mortality rate despite of receiving standard therapy including radiation, surgery, and/or chemotherapy.

Understanding the molecular mechanisms and signaling pathways involved in oncogenesis have led to the development of novel targeted anticancer therapies. Recently, it has been shown that mesenchymal stem cells (MSCs) residing within tissue are recruited to sites of tissue damage and inflammation. This property led to the use of MSCs as vehicles for gene therapy and to deliver anticancer agents. Apart from acting as delivery vehicles, MSCs have also been shown to interact with tumors and cause tumor growth inhibition and abolishment depending upon the tumor type they come into contact with.

The Umbilical cord contains two arteries and one vein, which is surrounded by mucoid connective tissue and this, is called the "Wharton's Jelly". *Troyer and Weiss* examined the immune properties of human Wharton's jelly mesenchymal stem cells (WJMSCs) and concluded that there was no evidence to suggest the immune rejection of these cells in vivo.

*Mitchell et al.* found that matrix cells from Wharton's jelly can be induced to form neurons and glia cells by treating them with basic fibroblast growth factor and low-serum media. *Ganta et al.* found that intra-tumoral injection of rat umbilical cord matrix stem cells (rUCMSCs) caused complete regression of rat mammary carcinomas with no evidence of tumor metastasis.

**Aim of the Study:** This study was conducted to evaluate the anticancer activity of Wharton's jelly mesenchymal stem cells on SCC cell line.

## Material and Methods:

### 1. Cell Lines:

- Laryngeal Squamous cell carcinoma cell line (HEP-2).
- Human Wharton's Jelly Mesenchymal Stem Cells (hWJMSCs).
- Both cell lines were supplied from Cell culture department, VACSERA, EGYPT.

### 2. Tissue Culture Technique

- HEP-2 Cell Line and WJMSCs Cells were propagated in tissue culture flasks.
- The conditioned medium of WJMSCs was harvested to be used in this study.

### 3. Grouping

- Group I: untreated HEP-2 Cell Line (Control Group).
- Group II: HEP-2 Cell Line treated with WJMSCs-CM.

### 4. Assessment of the results:

- Flowcytometry was used to detect the percentage of Apoptosis using Annexin V-FITC Kit.
- Real time PCR was used to detect the gene expression of: p53 and Bcl-2 genes.
- The assessment was done after 24, 48 and 72 hours of treatment.

## Conclusions:

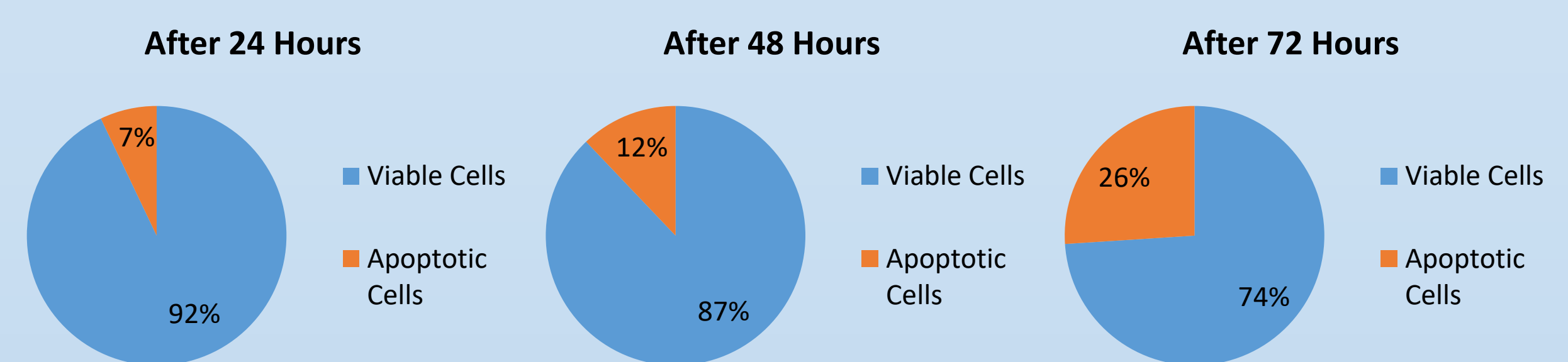
From the results of this study, it could be concluded that:

1. WJMSCs-CM has an apoptotic effect on HEP-2 cell line.
2. The apoptotic effect of WJMSCs-CM on HEP-2 cell line was minimal after 24 hours and gradually increased after 48 and 72 hours.

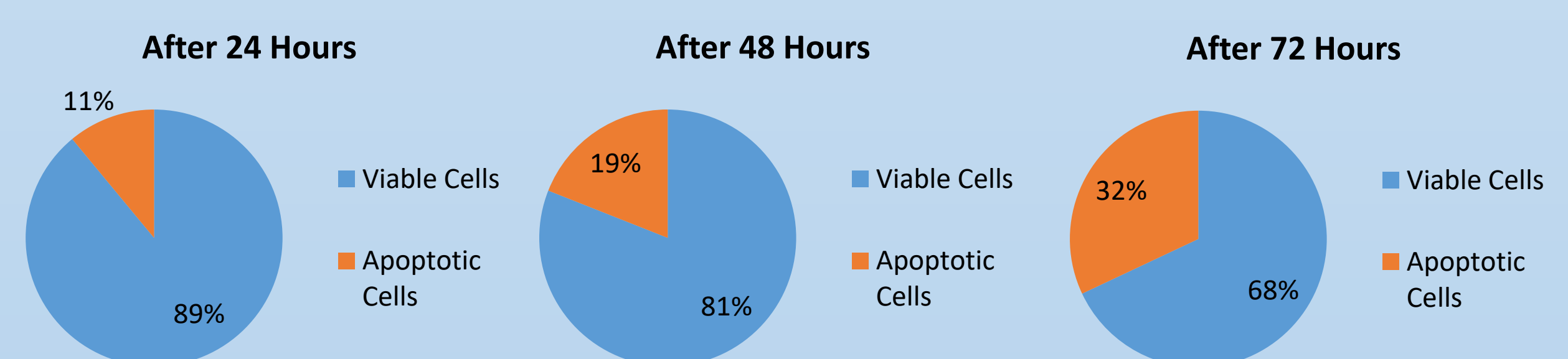
## Results:

### 1. Flowcytometry Results

#### • Group I (Control Group) [untreated HEP-2 cell Line]

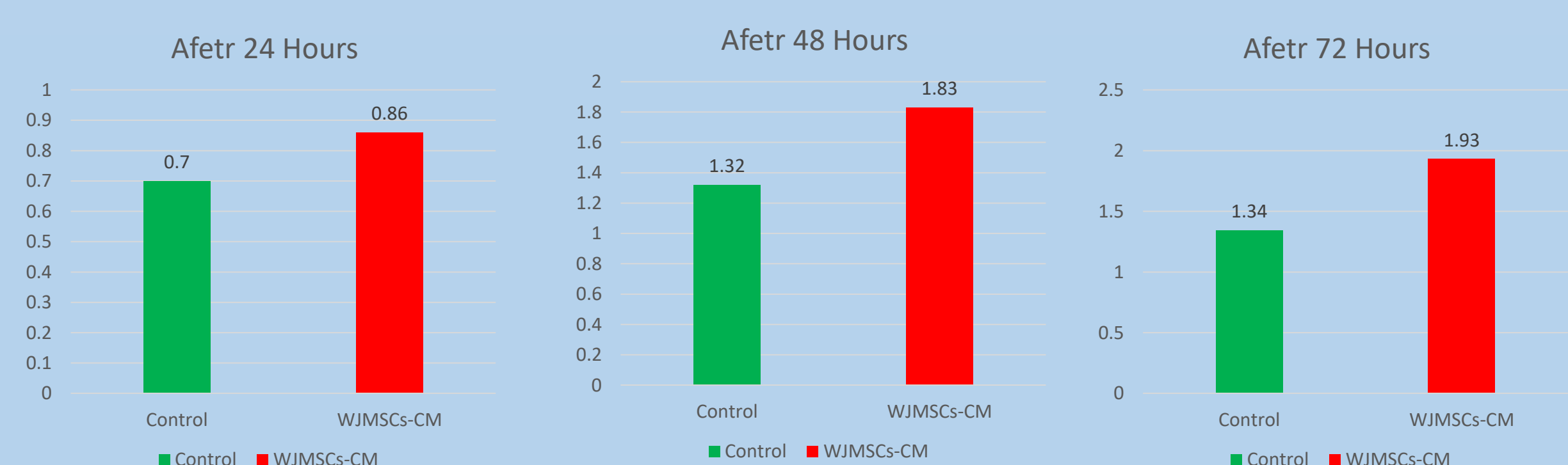


#### • Group II (HEP-2 cell line treated with WJMSCs-CM)



### 2. PCR Results

#### • Expression of p53 gene:



#### • Expression of Bcl-2 gene:

