RESULTS

This study was carried out from October 2005 and completed in June 2007; it was carried on 40 cases of otitis media selected from ENT Outpatient Clinic of Benha University Hospital

Out of forty patients 23 (57.5%) were male and 17 (42.5%) were female. Their age were ranged from 6-54 months with Mean ± SD (31.38 ± 22.24). This is shown in table (1).

Table (1): Age and sex of the studied cases:

Age and sex of cases	**N = 40**	
Age (Months)		
Range (Mean ± SD)	6-54 months	(31.38 ± 22.24)
Sex	**No.**	**%**
Male	23	(57.5)
Female	17	(42.5)

The age distribution was 30 cases (75%) were less than 2 years, 10 cases (25%) were older than 2years. There was a highly statistical significant difference in age distribution of the study group. This is shown in table (2).

Table (2): Age distribution of the study group (in months):

Age	No	%
0-24	30	75
24-54	10	25
Total	**40**	**100 %**

Z=3.65 **P<0.001(highly significant)**

The sex distribution among patients less than 2 years was 20 males (66.5%) and 10 females (33.5%)**.** There was statistical significant difference between sex and age of patients less than 2 years. This is shown in table (3).

Table (3): Showing sex in relation to age (< 2 y):

Age	sex		Total
< 2 y	male	Female	30(100%)
	20 (66.5%)	10 (33.5%)	

Z = 1.93 **P < 0.05**

Bacteriological examination of ear discharge samples revealed 23 (57.5%) positive cases of 40 cases as follows: 7 (17.5%) positive cases for *Strept. pneumoniae*, 6 (15%) positive cases for *H.influenza*, 4 (10%) positive cases of *Moraxella catarrhalis*, 2 (5%) positive cases of *Staph. aureus*, one (2.5%) positive case of *Pseudomonas*, in addition to mixed *Strept. pneumoniae, H. influenza* and *Moraxella catarrhalis* infection in one case (2.5%), and mixed *Strept. pneumoniae* and *H. influenza* infections in two cases (5%). No anaerobic bacteria were isolated as shown in table (4).

Table (4): Results of bacteriological examination of ear discharge samples.

Organism	No of positive cases	%
Aerobic bacteria		
Strept. pneumonia	7	17.5 %
Heamophilus influenza	6	15 %
Moraxella catarrhalis	4	10 %
Staph aureus	2	5 %
Pseudomonas	1	2.5 %
Strept.pneumonia+HI+M.C	1	2.5 %
Strept.pneumonia+HI	2	5 %
Total	**23**	**57.5 %**
Anaerobic bacteria	0	

As regard to cell culture confirmed by direct IF for detection of respiratory viruses, our results revealed 21 (52.5%) positive cases of 40 cases as follows: 11 (27.5%) positive cases for RSV, 5 (12.5%) positive cases for PIV, 1(2.5%) positive case for adenovirus and 4 (10%) positive cases for influenza A virus as shown in table (5).

Table (5): **Results of cell culture confirmed by direct IF for detection of respiratory viruses.**

Organism	No of positive cases	%
RSV	11	27.5%
PIV	5	12.5%
Adenovirus	1	2.5%
Influenza A virus	4	10%
Influenza B virus	0	0
Total	**21**	**52.5%**

As regard to IgM detection by indirect IF, using pneumoslide-M test, our results revealed 19 (47.5%) positive serum samples of 40 cases. Out of them, 9 (22.5%) cases were positive for RSV, 5 (12.5%) cases were positive for PIVs, 1 (2.5%) case was positive for adenovirus and 4 (10%) cases were positive for influenza A virus. These results are shown in table (6).

Table (6): Results of indirect IF by pneumoslide M. test for detection of respiratory viruses.

Organism	No of positive cases	%
RSV	9	22.5%
PIV	5	12.5%
Adenovirus	1	2.5%
Influenza A virus	4	10%
Influenza B virus	0	0
Total	**19**	**47.5%**

Results of indirect IF using the pneumoslide-M test were compared to those of cell culture for detection of respiratory viruses. Indirect IF revealed 20 positive serum samples for respiratory viruses. Out of them, 10 cases were positive for RSV, 5 cases were positive for PIVs, 1 case was positive for adenovirus, 4 cases were positive for influenza A virus. Results of cell culture revealed 21 positive cases including the 23 positive cases diagnosed by pneumoslide-M in addition to one RSV case which showed cross reactivity by indirect IF. These results are shown in table (7).

Table (7): Showing comparison between results of indirect IF using pneumoslide-M test and cell culture for detection of respiratory viruses.

	Pneumoslide-M test	**Tissue culture**
RSV	10	11
PIVs	5	5
Adenovirus	1	1
Influenza A	4	4
Influenza B	0	0
Total	**20**	**21**

Indirect IF using the pneumoslide-M was evaluated as a screening test for diagnosis of respiratory viruses regarding that cell culture is confirmatory. The sensitivity of the test was 95%, specificity was 100%. The positive predictive value was 100%, the negative predictive value was 95.2% and the accuracy was 97.5%. These results are shown in table (8).

Table (8): Showing validity of indirect IF using pneumoslide-M, in diagnosis of respiratory viruses test as a screening test regarding that cell culture is the confirmatory test.

Validity of pneumoslid-M test	%
Sensitivity	95%
Specificity	100%
Positive predictive value	100%
Negative predictive value	95.2%
Accuracy	97.5%

As regard to bacterial isolation from ear discharge, cell culture for detection of viruses in ear discharge and IgM detection by indirect IF using Pneumolside M test, bacterial causes were identified in 16 cases (40%), viral causes were identified in 14 cases (35%), mixed viral and bacterial agents were identified in 7 cases (17.5%), in addition to 3 of undiagnosed cases (7.5%).This is shown in table (9).

Table (9): The etiological agents of OM:

Etiological agents	No.	%
Bacterial agents	16	40 %
Viral agents	14	35 %
Mixed infection (viral &bacterial)	7	17.5 %
Total	**37**	**92.5 %**
Undiagnosed	3	7.5 %

As regard to the bacteriological examination of ear discharge samples, bacterial causes of OM were identified in 16 cases (40%). Out of these 16 positive cases, 4 cases of pneumococcal infection (10%), 4 cases of *H.influenza* infection (10%), 2 cases of *Moraxella catarrhalis* infection (5%) 2 cases of *Staph. aureus* infection (5%), one case of *Pseudomonas,* infection (2.5%), in addition to combined infection with *Strept. pneumoniae, H.influenza* and *Moraxella catarrhalis* (5%) and combined infection with *Strept. pneumoniae,H.influenza* (2.5%). These results are shown in table (10).

Table (10): Bacterial causes of OM.

Organism	No. of positive cases	%
Strept. pneumonia	4	10 %
Heamophilus influenza	4	10 %
Moraxella catarrhalis	2	5 %
Staph. aureus	2	5 %
Pseudomonas	1	2.5 %
Strept.pneumonia+HI+M.C	1	2.5 %
Strept.pneumonia+HI	2	5 %
Total	**16**	**40 %**

Viral causes of OM were identified in 14 cases. Out of these positive cases, 9 cases were caused by RSV infection (22.5%), 3 cases of PIV (7.5%), one case of adenovirus (2.5%), and one case of influenza A virus infections (2.5%) as shown in table (11).

Table (11): Viral agents of OM:

Viral agent	No	%
RSV	9	22.5 %
PIV	3	7.5 %
Adenovirus	1	2.5 %
Influenza A virus	1	2.5 %
Total	**14**	**35%**

Mixed viral and bacterial infections were diagnosed in 7cases (17.5%). Out of these 7 cases, mixed RSV and *H. influenza* infection was detected in one case (2.5%), mixed RSV and *M.C* was diagnosed in one case (2.5%), mixed PIV and *M.C* infection was diagnosed in one case (2.5%), mixed PIV and *H. influenza* in another case (2.5%), in addition to 3 cases (7.5%) of mixed IV and *Strept pneumonia* infection. These results are shown in table (12).

Table (12): Mixed viral and bacterial agents of OM

Etiological agents	No	%
RSV + *H.influenza*	1	2.5 %
RSV + *M. C*	1	2.5 %
PIV+ *M.C*	1	2.5 %
PIV+ *H. influenza*	1	2.5 %
IV+ *Strept. pneumonia*	3	7.5 %
Total	**7**	**17.5 %**

The relationship between etiological agents of OM and sex was studied. The fourteen positive cases for virus infection include 7 males (50) and 7 females (50%). The ten bacterial cases include 10 male patients (62.5%) and 6 female patients (37.5%). Mixed viral and bacterial infections were detected in 4 males (57.5%) and 3 females (42.5%). Statistical analysis of these data demonstrated non statistical significant difference between etiological agents of OM and sex. This is shown in table (13).

Table (13): Relationship between etiology of OM and sex.

Etiological agents	Total number	Males		Females	
		No	**%**	**No**	**%**
Viral causes	14	7	50	7	50
Bacterial causes	16	10	62.5	6	37.5
Mixed infection	7	4	57.5	3	42.5

P> 0.05(non significant) $\mathbf{X^2}$=0.47

The relationship between etiological agents of OM and age are studied. The mean age of patients with diagnosed viral infection is 27.63 ± 22.16. The mean age of patients with diagnosed bacterial infection is 32.64 ± 21.36.Statistical analysis demonstrated significant difference in the mean age among different etiological agents with viral agents are detected at a younger age than bacterial agents as shown in table (14).

Table (14): The relationship between etiological agents of OM and age (in months).

Etiological agent	No.	(Range)	Mean age ± SD
Viral	14	(6-54)	27.63 ± 22.16
Bacterial	16	(10-54)	32.64 ± 21.36
Mixed	7	(8-54)	24.29 ± 15.81
F	3.5		
P	< 0.05		

The mean age of patients with RSV infection was 15.18 ± 8.61 months. The mean age of patients with PIV infection was 29.4 ± 10.59. The mean age of patients with influenza A virus infection was 35 ± 18.87 months. Statistical analysis demonstrated non-statistically significant in the mean age of patients of different viral agents. This is shown in table (15).

Table (15): The relationship between different viral agents of OM and age of the patients (in months).

Viral agents	**No**	**(Range)**	**Mean ± SD**
RSV	11	(8 -24)	15.18 ± 8.61
PIVs	5	(15-36)	29.4 ± 10.59
Influenza A virus	4	(8-48)	35 ± 18.87
Total	**20**		
F	0.56		
P	> 0.05 NS		

NS= non significant

The most common complaint was rhinitis representing 80% followed by bronchitis 50% then pharyngitis and hearing loss each representing 10% and lastly ear discharge representing 5%. This is shown in table (16).

Table (16): Showing different complains of the study group.

Complaint	No	%
Rhinitis	32	80 %
Bronchitis	20	50 %
Discharge	2	5 %
Pharyngitis	4	10 %
Hearing loss	4	10 %

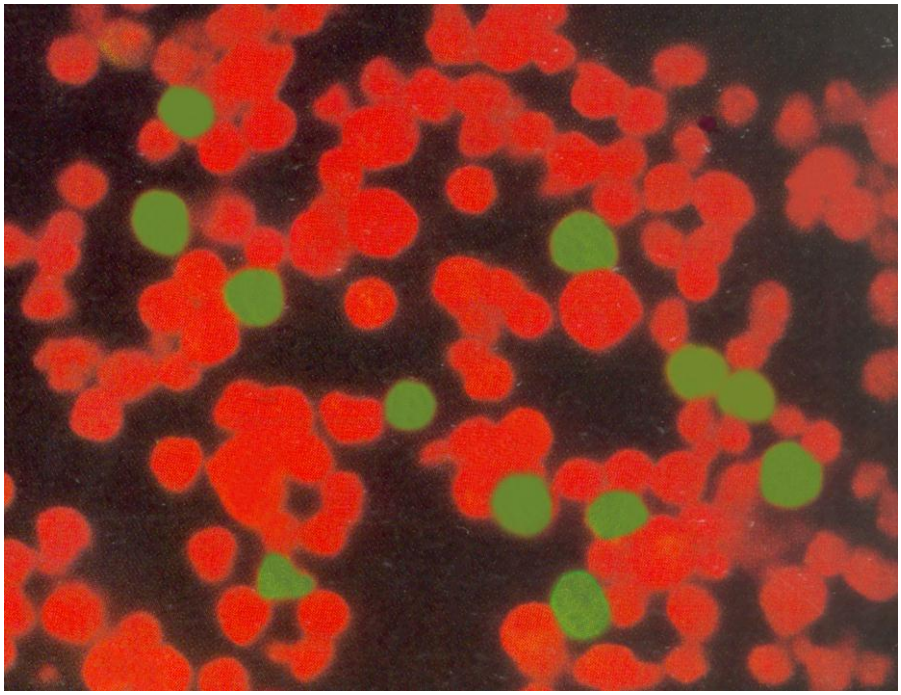

Figure (8): Positive indirect IF using pneumslide- M for adenovirus showing apple green fluorescence of the cells.

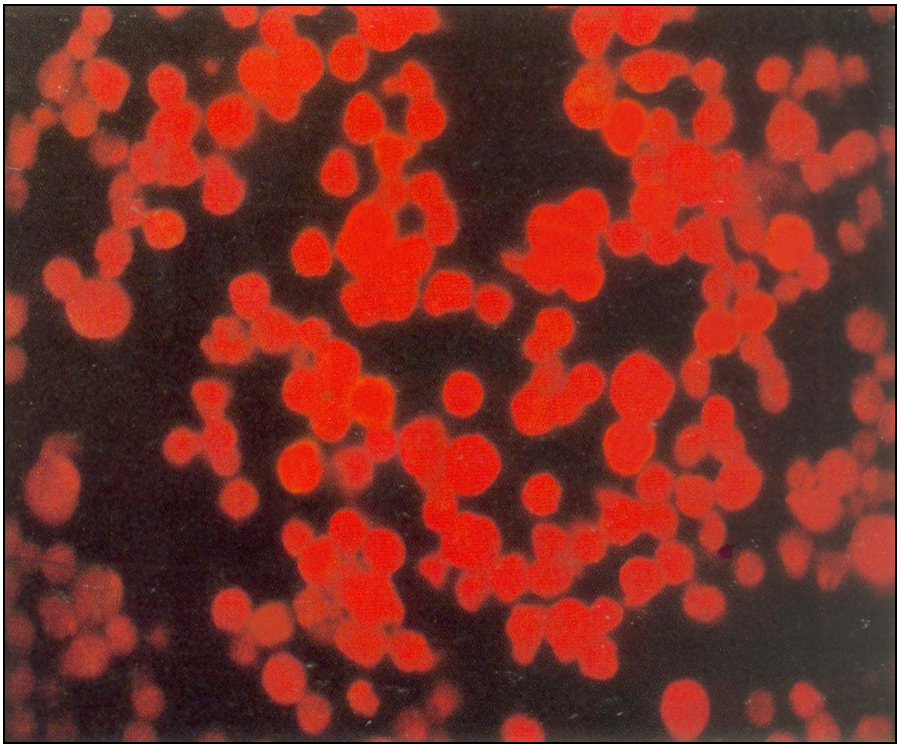

Figure (9): Negative indirect IF using pneumslide- M showing dull red staining of the cells.

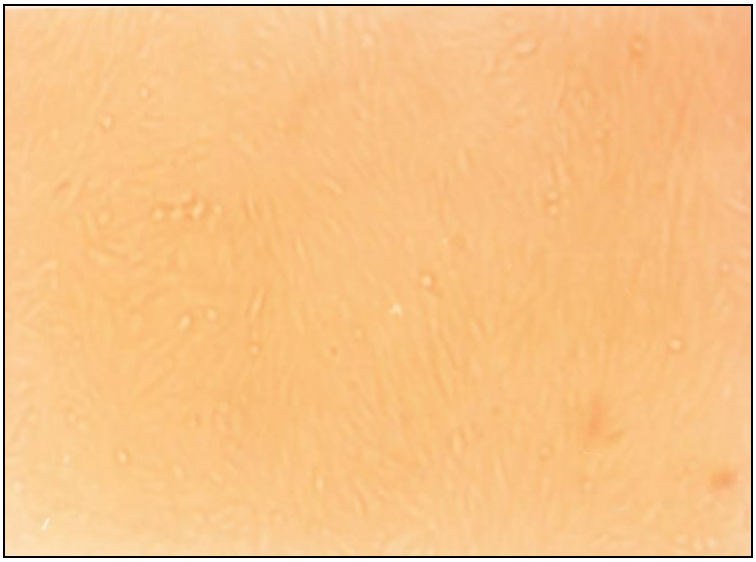

Figure (10): Confluent sheet of HEP-2 cells.

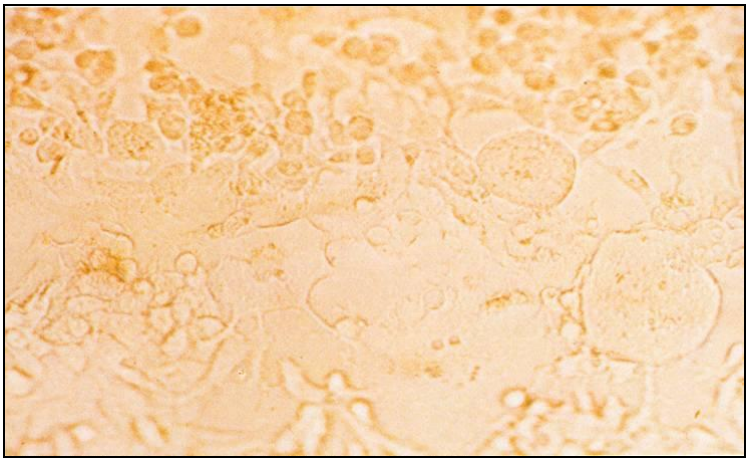

Figure (11): CPE of RSV showing enlarged syncytial cells.

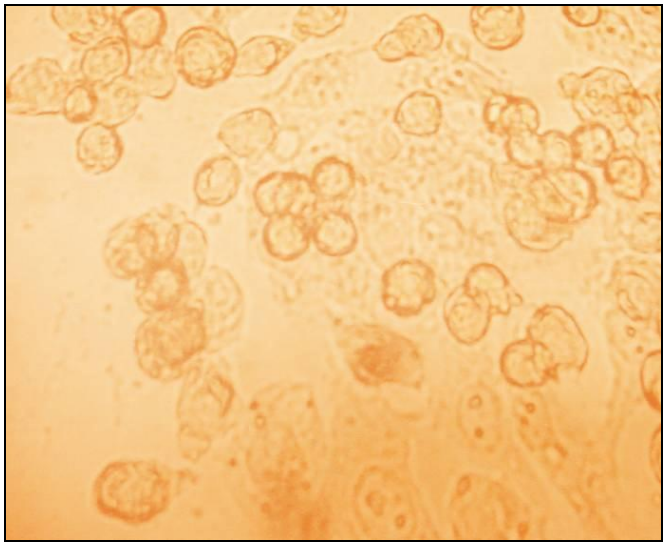

Figure (12): CPE of adenovirus showing grape like clusters of rounded separated cells.

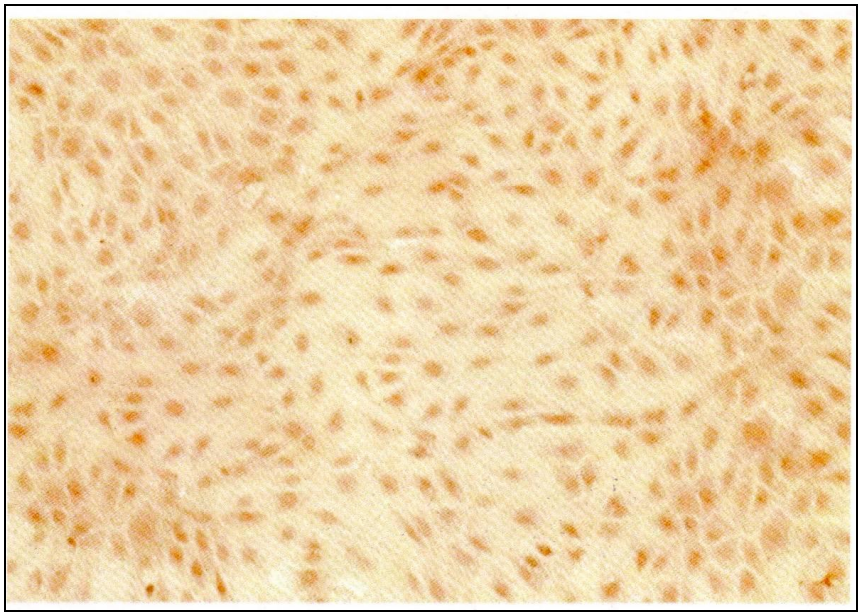

Figure (13): Confluent sheet of MDCK cells.

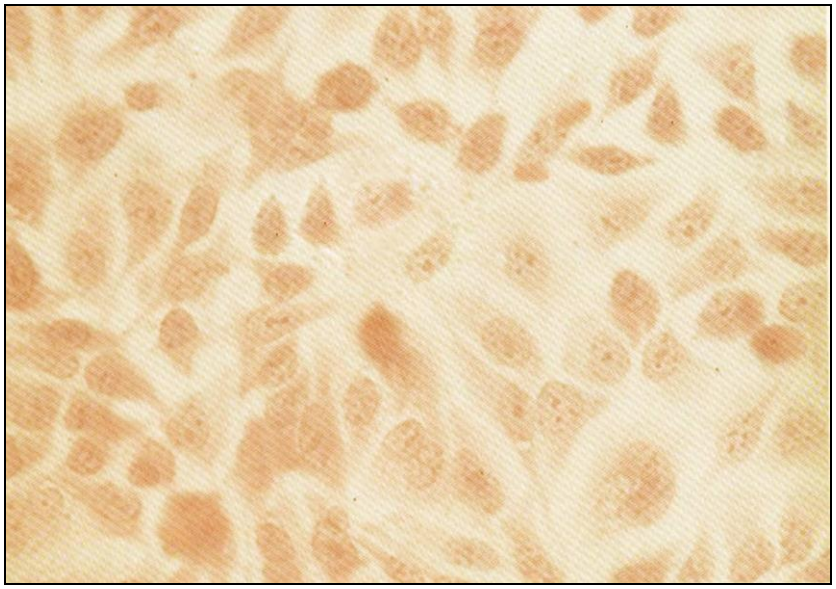

Figure (14): CPE of influenza A virus showing rounding and separation of the cells.

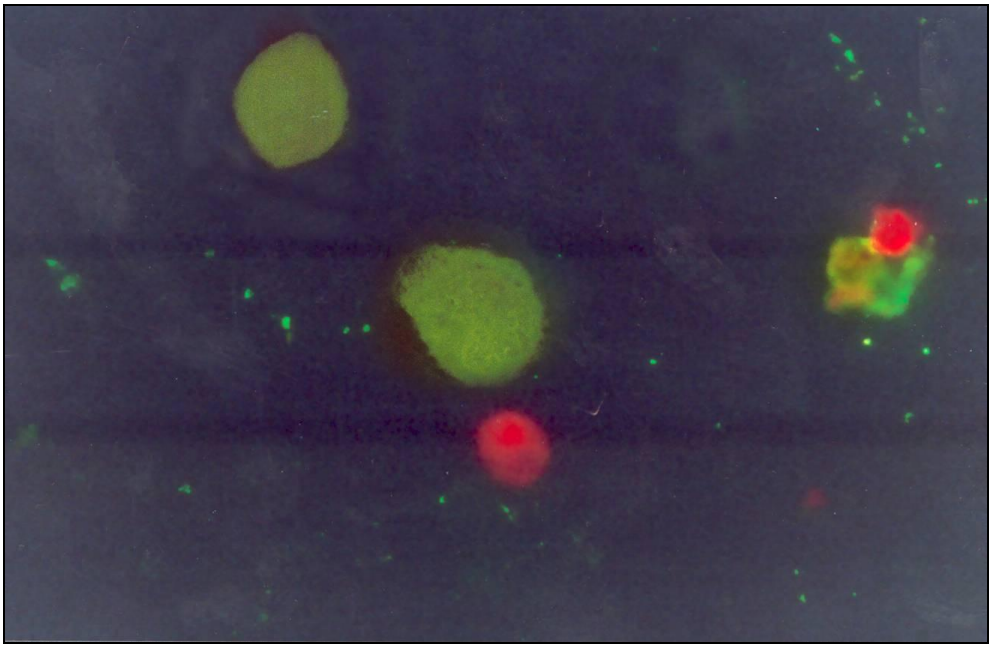

Figure (15): Positive direct IF for RSV after cell culture showing apple green fluorescenence of infected cells.

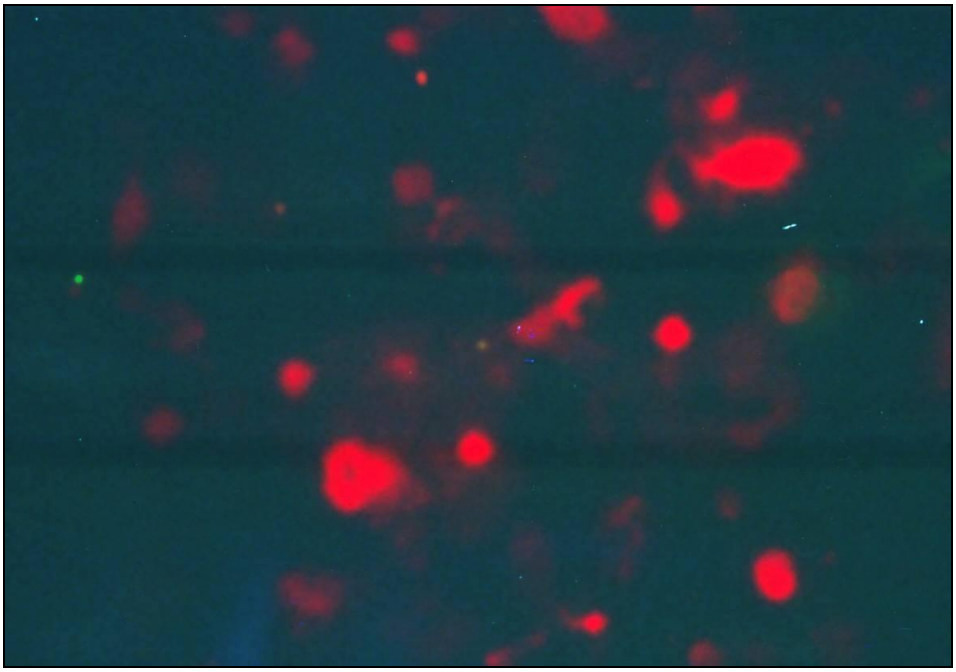

Figure (16): Negative direct IF after cell culture showing dull red staining of the cells.