

# Detection of some DNA repair systems of *Klebsiella pneumonia* isolated from patients with urinary tract infection

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## ABSTRACT

**Background:** This study included the detection of the DNA repair systems of *Klebsiella* bacteria isolated from urinary tract infections. Ultraviolet rays and caffeine were used in this study, which has the ability to cause dimers in the DNA strip to detect the photo-DNA repair system and the eradication system.

**Methodology :** *Klebsiella pneumonia* exhibited 254 nm for Ultraviolet Radiation For a length of 100, 120 , 160 , 180 seconds, then take two ml of every A therapy of zero leaves 1 mL of them in the darkish and 1 mL of mild For an hour then I made a collection of comfort for her and planted it on Feeding nests and protecting the dishes with aluminum foil and incubated 37 for 24 hours.

**Result :** shows the effect of ultraviolet rays on the growth of *Klebsiella* bacteria in different time periods 100, 120,160,180 seconds, as it was noticed that the bacteria that were exposed to periods of radiation and were left in the dark decreased their growth compared to the bacteria that were left in the light, as we did not notice that they were affected much, this is for the period of irradiation of 100 seconds. Also, the growth decreases as the periods of irradiation increase, and this is due to the direct effect of killing the bacteria. We conclude from this that this bacteria has a photo-DNA repair system.

**Keywords:** *klebsiella*, DNA repair system.

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## INTRODUCTION

There is a clear distinction between simple urinary tract infection, that is, an infection in the lower urinary tract in a non-pregnant woman, and complex infection (all the rest, Every male infection, as well as a kidney infection, is a complex infection<sup>(1,2)</sup> Of all human infections, UTIs are the most common and require antibiotic treatment. The percentage of infections increases with age, and it is more prevalent among women: at the age of 16-35 it reaches 20%, and at the age of 65 and over it reaches 40%.<sup>(3,4)</sup> The infection rate in men, up to the age of 35, is less than 1% and increases to 20% and more over the age of 65, as a result of an enlarged prostate.<sup>(5,6)</sup> Urinary tract infection is usually an ascending infection, meaning that the bacteria (bacteria) causing the infection originate in the woman's vulva (vulva) and in the anus (anus).<sup>(7,8)</sup> The occurrence of infection depends on the virulence and type of germ, as well as on the factors related to the patient. For example, complete bladder emptying is of great importance.<sup>(9)</sup> Due to factors such as an enlarged prostate in a man, or a prolapsed uterine (uterine) in a woman, the emptying is not complete.<sup>(10)</sup> The infection may stem from a defect in the valve between the ureters and the urinary bladder, from the presence of stones in the urinary system, or from every congenital defect in the urinary system.<sup>(11)</sup> The changes that occur in the genetic material may affect more than one side, as they may be fatal to cells or lead to changes that are not in the interest of the cell, but they may be in the interest of use for the production of materials, and on the other hand they represent an important support in the processes of developing species, and in biology The microscopic, especially the small ones, such as bacteria, which represent the simplest and smallest organisms, must have very efficient repair systems for their genetic material, because prokaryotic cells have an individual genome and thus one copy of each gene.<sup>(12)</sup> Most of its materials or codes are effective, and therefore any damage to the genome will have catastrophic consequences for cells if

they are not fatal, and therefore the living appears to be normalized to continue life.<sup>(13)</sup> There are many environmental factors that can affect the cells, perhaps the most important of which is the entry of the cells to the stage of stability where the numbers and excretions increase, and this leads to the emergence of mutations, in addition to other environmental factors, some of which can be mentioned in a simple way such as radiation, drought, temperature.<sup>(14)</sup>

## METHODOLOGY

### Detection of photo DNA repair system

*Klebsiella pneumonia* exhibited 254 nm for Ultraviolet Radiation For a length of 100, 120 , 160 , 180 seconds, then take two ml of every A therapy of zero leaves 1 mL of them in the darkish and 1 mL of mild For an hour then I made a collection of comfort for her and planted it on Feeding nests and protecting the dishes with aluminum foil and incubated 37 for 24 hours.<sup>(15)</sup>

### Detection of the Excision repair system

The microorganism have been proven to have a distinct awareness of (10 ,15,20,25 ) Mm of caffeine Different from UV rays and planted on The feeder containing the awareness beneath the inhibitor of the lowest substance The plates have been protected with aluminum foil and incubated with a caffeine diploma 37 C for 24 h<sup>(16)</sup>

## RESULT AND DISCUSSION

**Table (1) The effect of the period of irradiation with ultraviolet rays on the growth of *Klebsiella pneumonia* bacteria**

**Descriptive Statistics**

Dependent Variable: Survival bacteria (Number of colonies)

time of radiation Sec.	reaction	Mean	Std. Deviation	N
100 sec	light reaction	30.50	.577	4
	dark reaction	25.50	.577	4
	Total	28.00	2.726	8
120 sec	light reaction	25.50	1.291	4
	dark reaction	16.33	1.528	3
	Total	21.57	5.062	7
160 sec	light reaction	19.75	2.217	4
	dark reaction	11.50	1.732	4
	Total	15.63	4.779	8
180 sec	light reaction	15.00	.816	4
	dark reaction	6.40	3.209	5
	Total	10.22	5.094	9
Total	light reaction	22.69	6.161	16
	dark reaction	14.31	7.804	16
	Total	18.50	8.120	32

The direct action of radiation involves interacting with atoms within DNA molecules or with other structures or cellular shapes in order for cells to grow. This reaction in cells may cause failure to divide or cause direct interference with a critical cellular system, in the case of DNA, direct action occurs when alpha and beta particles or X-rays produce ions that can cause chemically altered bases, breakdown of sugar-phosphate structures, and breakage Hydrogen bonds that link the base pairs. DNA damage - sometimes called DNA lesions - differs from a DNA mutation or mutation, even though both are the wrong types of DNA. DNA damage causes changes to the chemical structures of DNA, while Mutations are changes in the sequence of base pairs of nucleotides. However, failure to repair damaged DNA can lead to mutations, as mutations prevent genes from making the

correct protein. Table 1 shows the effect of ultraviolet rays on the growth of *Klebsiella* bacteria in different time periods 100, 120,160,180 seconds, as it was noticed that the bacteria that were exposed to periods of radiation and were left in the dark decreased their growth compared to the bacteria that were left in the light, as we did not notice that they were affected much, this is for the period of irradiation of 100 seconds. Also, the growth decreases as the periods of irradiation increase, and this is due to the direct effect of killing the bacteria. We conclude from this that this bacteria has a photo-DNA repair system.

Table (2) ANOVA table of **effect of the period of irradiation with ultraviolet rays on the growth of *Klebsiella pneumonia* bacteria**

**Tests of Between-Subjects Effects**

Dependent Variable: Survival bacteria (Number of colonies)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1965.383 <sup>a</sup>	7	280.769	85.713	.000
Intercept	11137.000	1	11137.000	3399.890	.000
time	1368.971	3	456.324	139.306	.000
reaction	473.131	1	473.131	144.437	.000
time * reaction	20.667	3	6.889	2.103	.126
Error	78.617	24	3.276		
Total	12996.000	32			
Corrected Total	2044.000	31			

a. R Squared = .962 (Adjusted R Squared = .950)

Table 2: Analysis of variance of the effect of ultraviolet irradiation on the growth of *Klebsiella* bacteria, where we note that there are significant differences in the growth of this bacteria between the treatments developing in light and

darkness and this confirms the existence of the photo-DNA repair system for these bacteria and the presence of significant differences between the time periods of irradiation and this confirms the direct effect of radiation.

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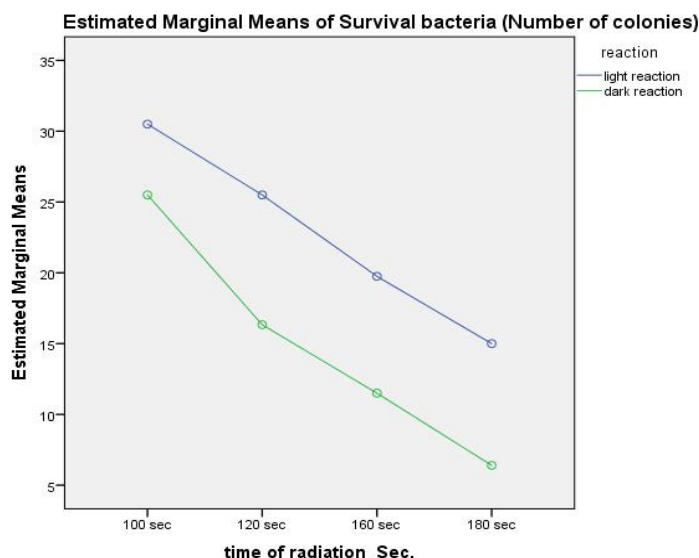


Figure 1 effect of the period of irradiation with ultraviolet rays on the growth of *Klebsiella pneumonia* bacteria  
Table (3) The effect of caffeine on the growth of *Klebsiella* bacteria during different irradiation periods

**Descriptive Statistics**

Dependent Variable: Survival bacteria (Number of colonies)

time of radiation Sec.	Caffeine 25%	Mean	Std. Deviation	N
100 sec	without Caffeine %	21.75	.957	4
	Caffeine %	14.00	1.633	4
	Total	17.88	4.324	8
120 sec	without Caffeine %	17.50	1.291	4
	Caffeine %	12.33	.577	3
	Total	15.29	2.928	7
160 sec	without Caffeine %	12.50	1.291	4
	Caffeine %	7.25	4.031	4
	Total	9.88	3.944	8
180 sec	without Caffeine %	4.50	1.291	4
	Caffeine %	2.20	1.643	5
	Total	3.22	1.856	9
Total	without Caffeine %	14.06	6.718	16
	Caffeine %	8.31	5.400	16
	Total	11.19	6.669	32

You may feel energetic and energetic after consuming your coffee, but there is a detriment to the excessive amount of caffeine that appears in the long term, as the Mayo Medical Corporation indicated that the permissible rate of caffeine is 400 mg per day, equivalent to 3 cups of coffee, and this rate must be adhered to to take advantage of caffeine. It helps the health of the nervous system, treat headaches and extreme drowsiness, and reduce the risk of developing Alzheimer's and dementia, as studies indicated, while excessive caffeine intake causes an increase in migraine and tension in addition to hallucinations and vomiting, and this excess may lead to death due to exposure. For many convulsions, excessive caffeine also leads to an increase in the accumulation of acids on the stomach, which causes heartburn and stomach upset, in addition to causing increased blood pressure due to the increase in the level of adrenaline immediately after taking it,

in addition to this, the intake of caffeine in large quantities increases the heart rate and makes it irregular. Thus, an increased risk of heart disease, and an increase in caffeine intake affects the bone system by increasing the risk of osteoporosis because it reduces calcium absorption. Table 3 shows the effect of caffeine on the growth of *Klebsiella* bacteria during different irradiation periods, where we notice a decrease in the number of colonies in the dishes to which caffeine was added by 25% compared to the dishes that did not add caffeine where the growth was better for it during the 100-second irradiation period, as well as the rest of the treatments than it proves the the Excision repair system to eradicate these bacteria. It has also been observed that the growth of these bacteria decreases as the period of irradiation increases and the presence of caffeine is an indication of the direct effect of killing bacteria by radiation.

Table (4) ANOVA table of The effect of caffeine on the growth of *Klebsiella* bacteria during different irradiation periods

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### Tests of Between-Subjects Effects

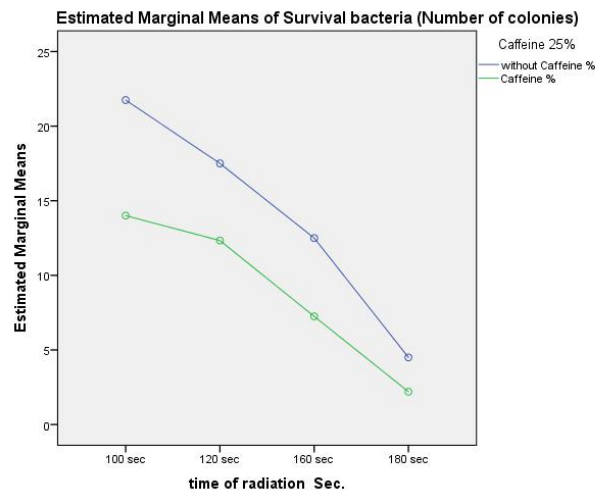
Dependent Variable: Survival bacteria (Number of colonies)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1292.908 <sup>a</sup>	7	184.701	51.565	.000
Intercept	4165.640	1	4165.640	1162.955	.000
time	1012.897	3	337.632	94.260	.000
Caffeine	206.009	1	206.009	57.513	.000
time * Caffeine	31.487	3	10.496	2.930	.054
Error	85.967	24	3.582		
Total	5384.000	32			
Corrected Total	1378.875	31			

a. R Squared = .938 (Adjusted R Squared = .919)

Table 4 Analysis of variance of the effect of caffeine on the growth of *Klebsiella* bacteria during different time periods where it was observed that there are significant differences between the treatments with the presence of caffeine compared to those that did not contain an indication of the

presence of a system of DNA repair, the type of excision as well as the presence of significant differences between the time periods with the presence of caffeine, and this proves the existence of This system .



**Figure 2** The effect of caffeine on the growth of *Klebsiella* bacteria during different irradiation periods

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