

People's Democratic Republic of Algeria

Ministry of Higher Education and Scientific Research

A/MIRA University of Bejaia

Faculty of Natural and Life Sciences

Department of Common Core Natural Sciences

Working Method and Terminology 1

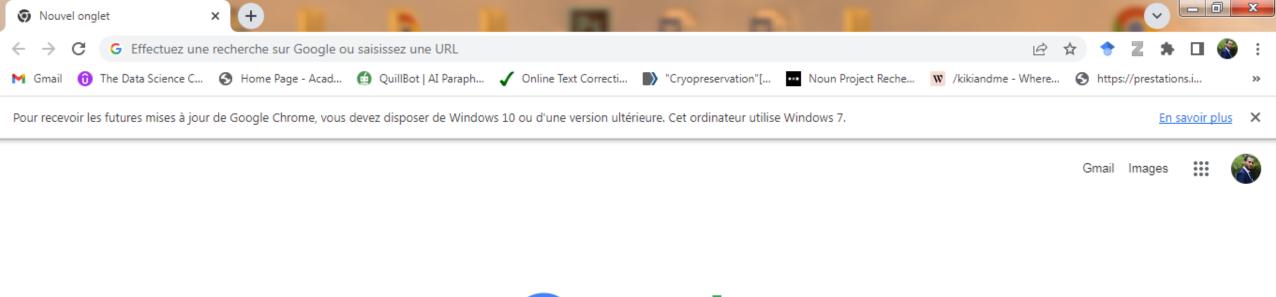
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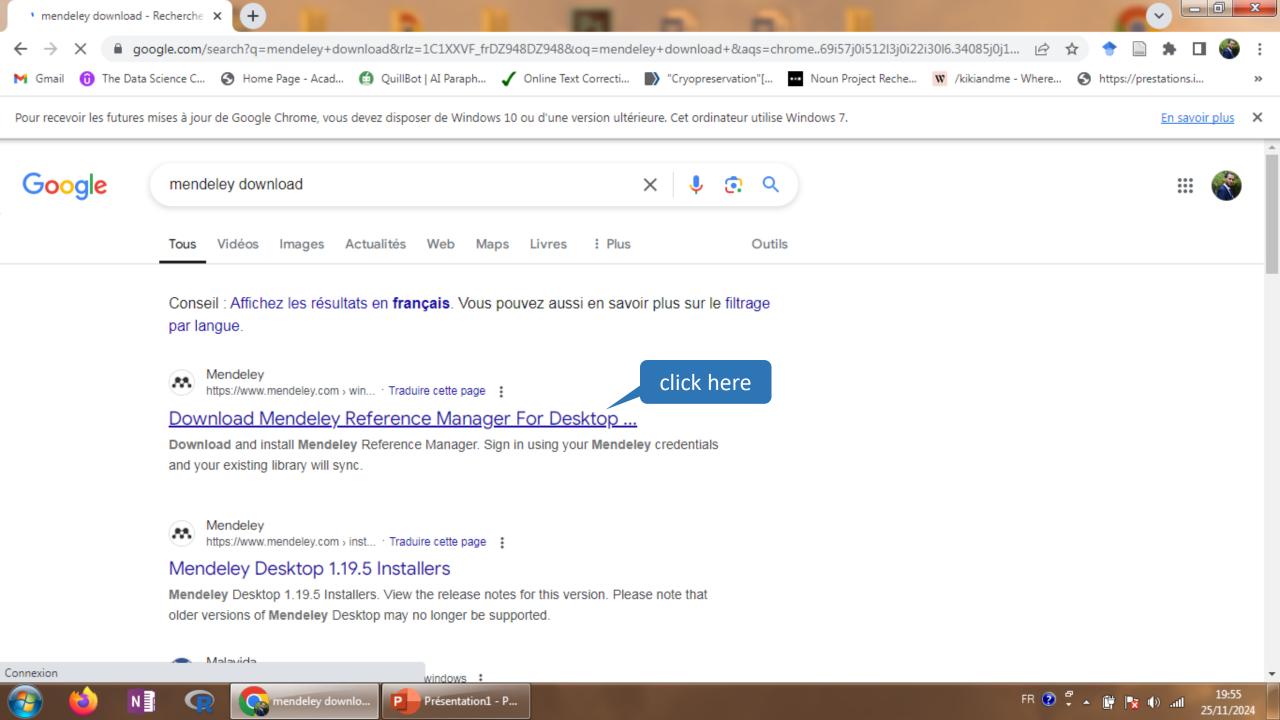


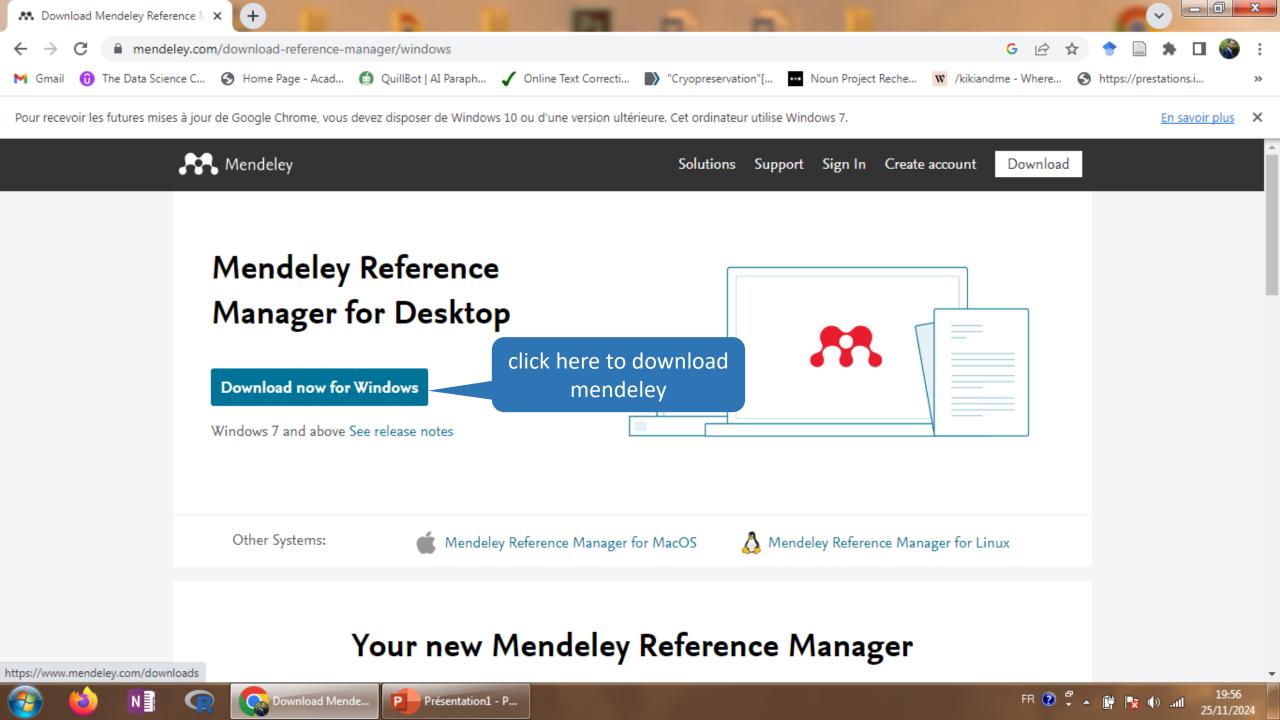














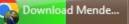


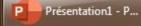


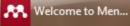








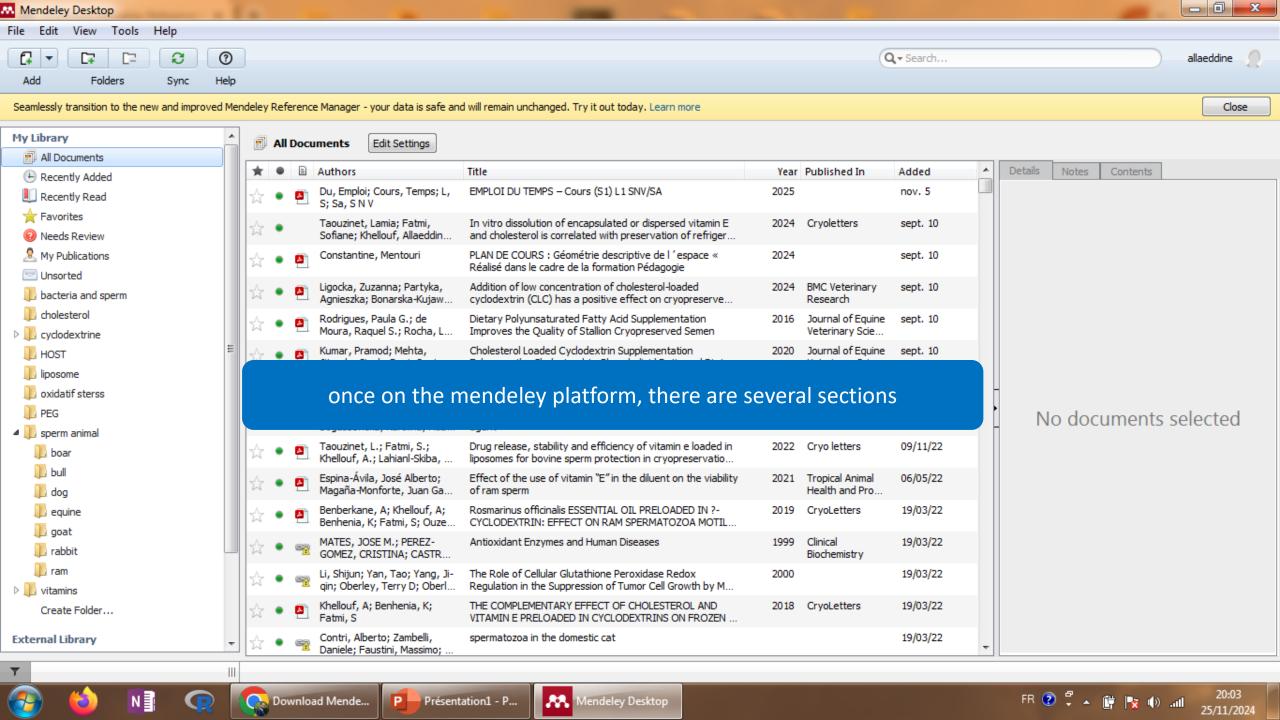


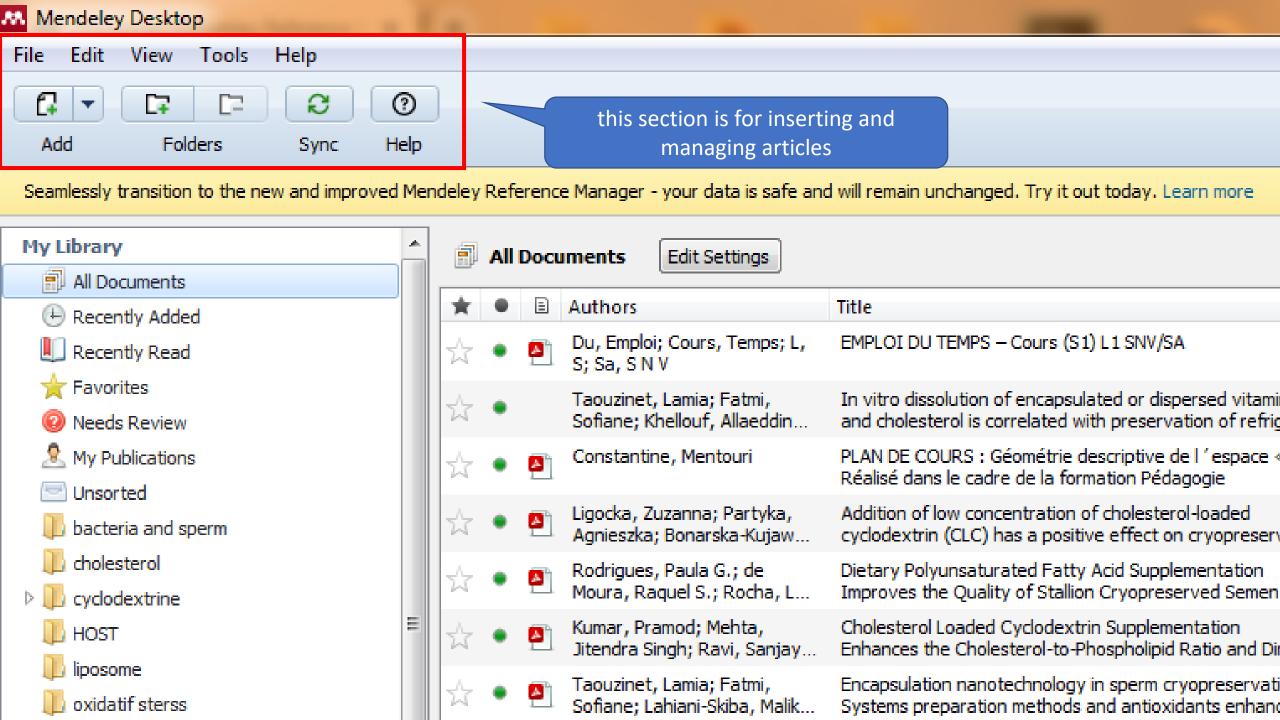






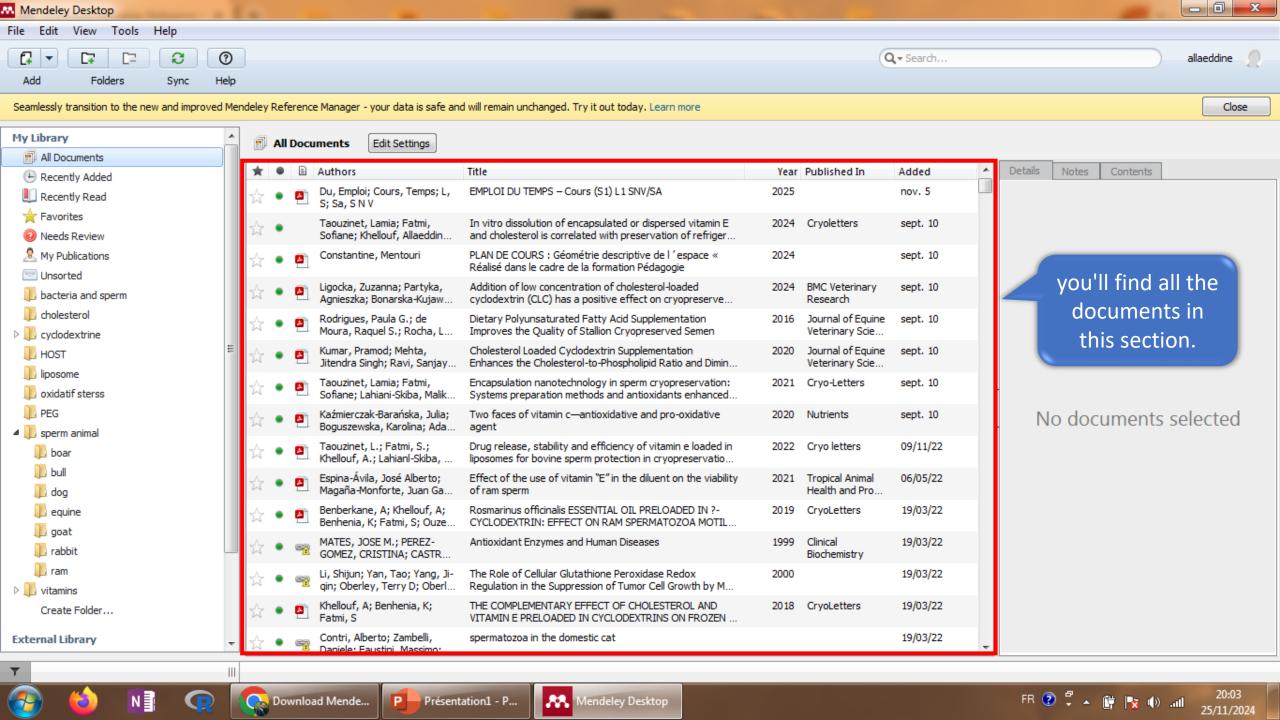




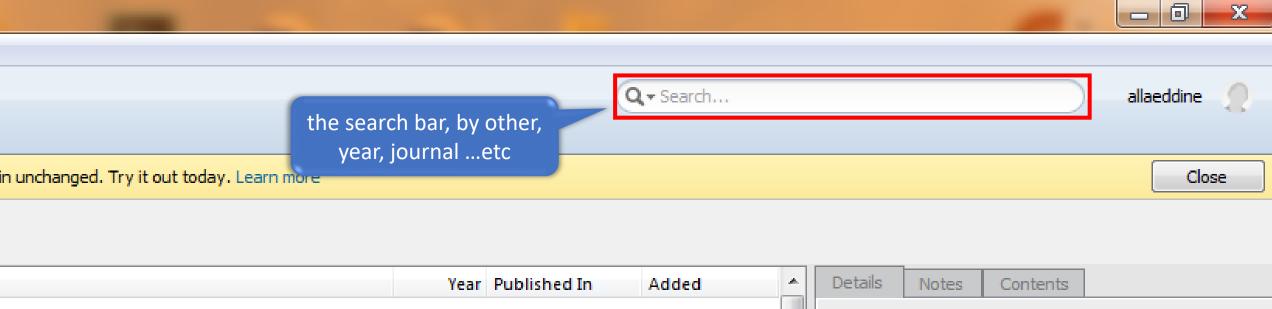


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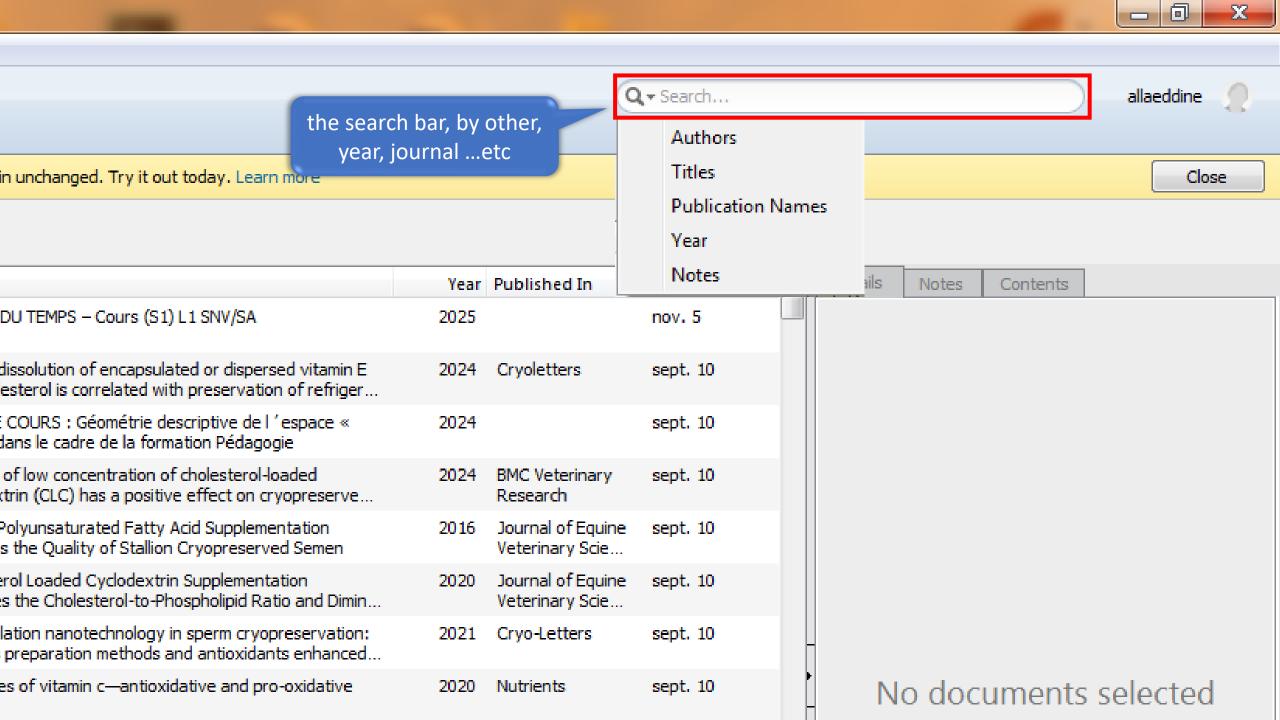
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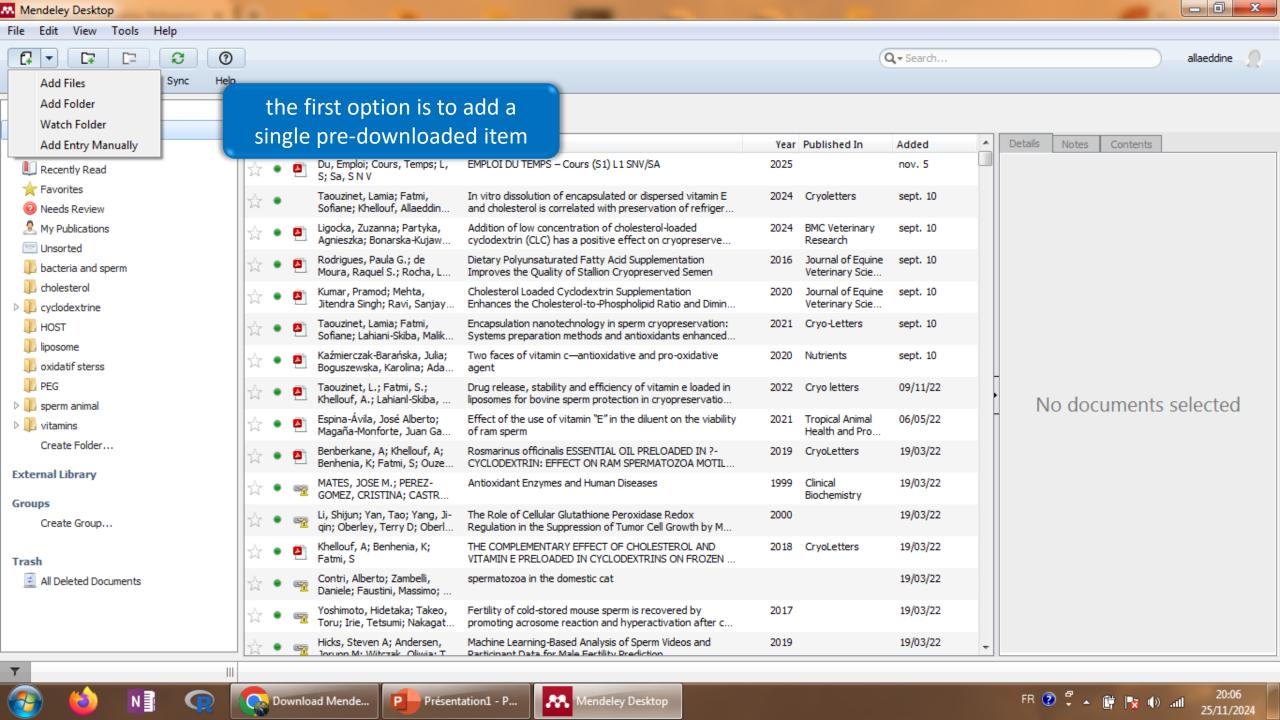


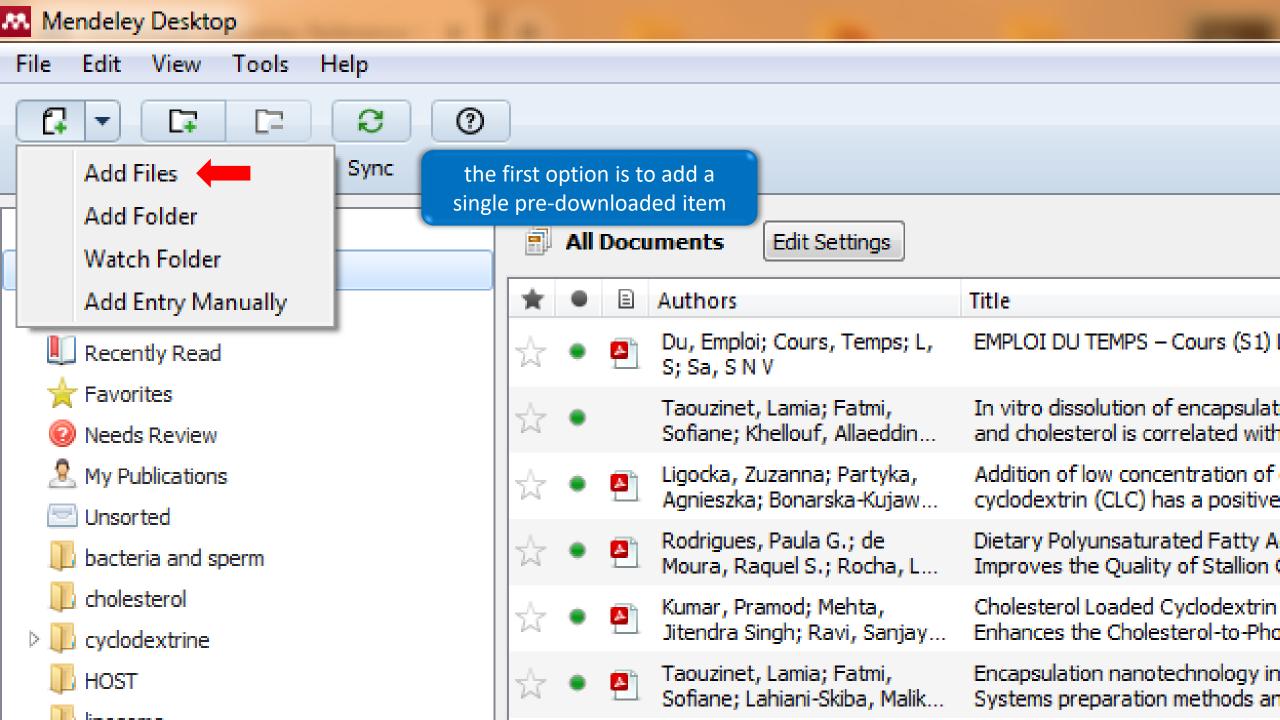
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7		OSE M.; PEREZ- RISTINA; CASTR	Antioxidant Enzymes and Human Diseases	1999	Clinical Biochemistry	19/03/22			
7		Yan, Tao; Yang, Ji- ey, Terry D; Oberl	The Role of Cellular Glutathione Peroxidase Redox Regulation in the Suppression of Tumor Cell Growth by M	2000		19/03/22			
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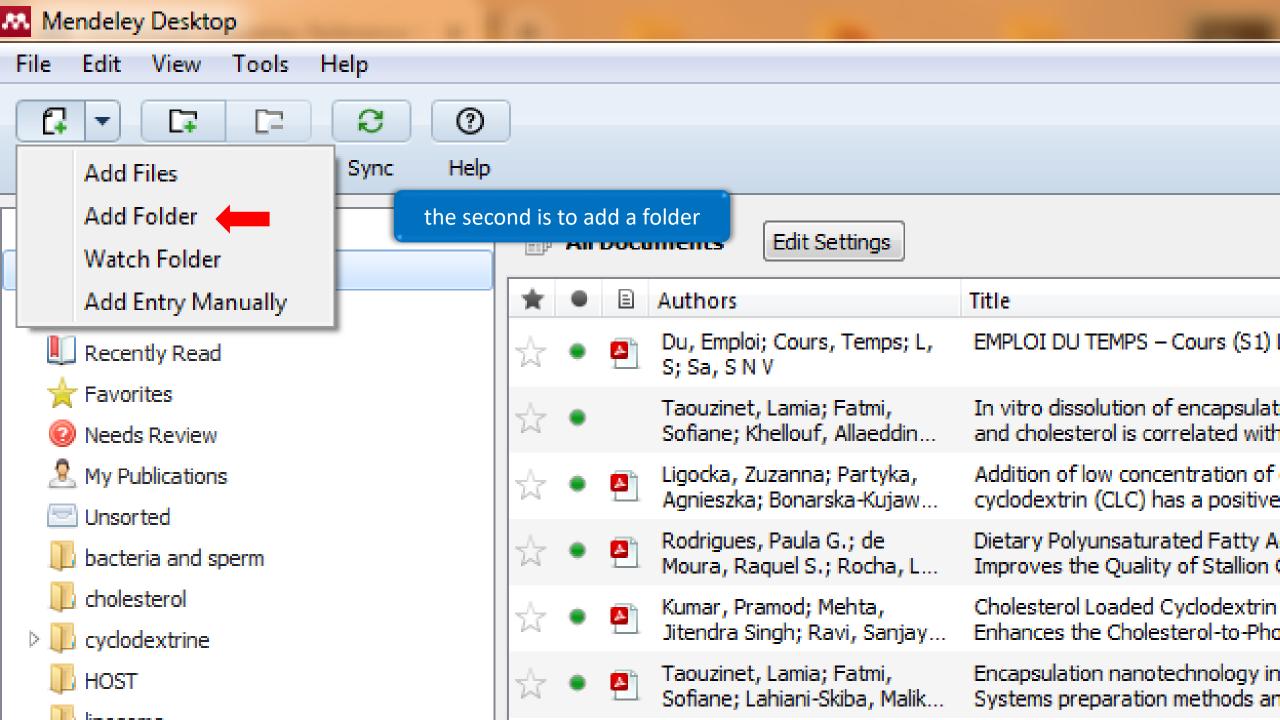


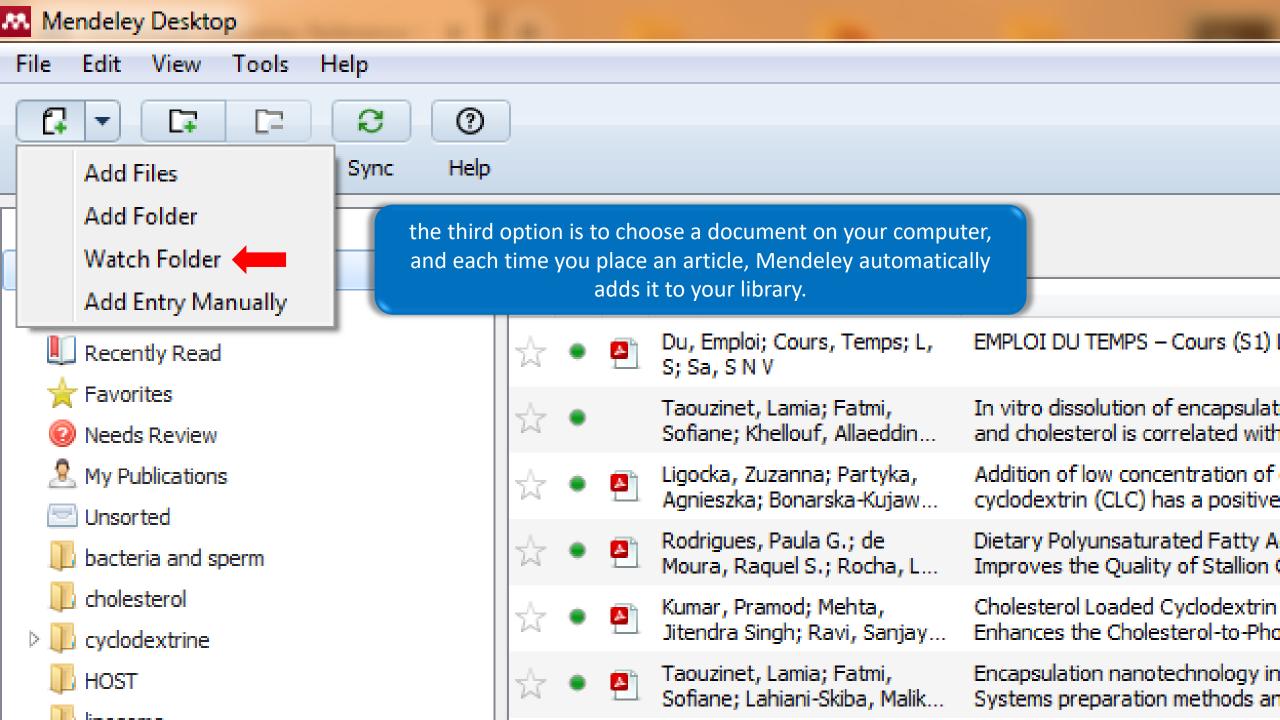
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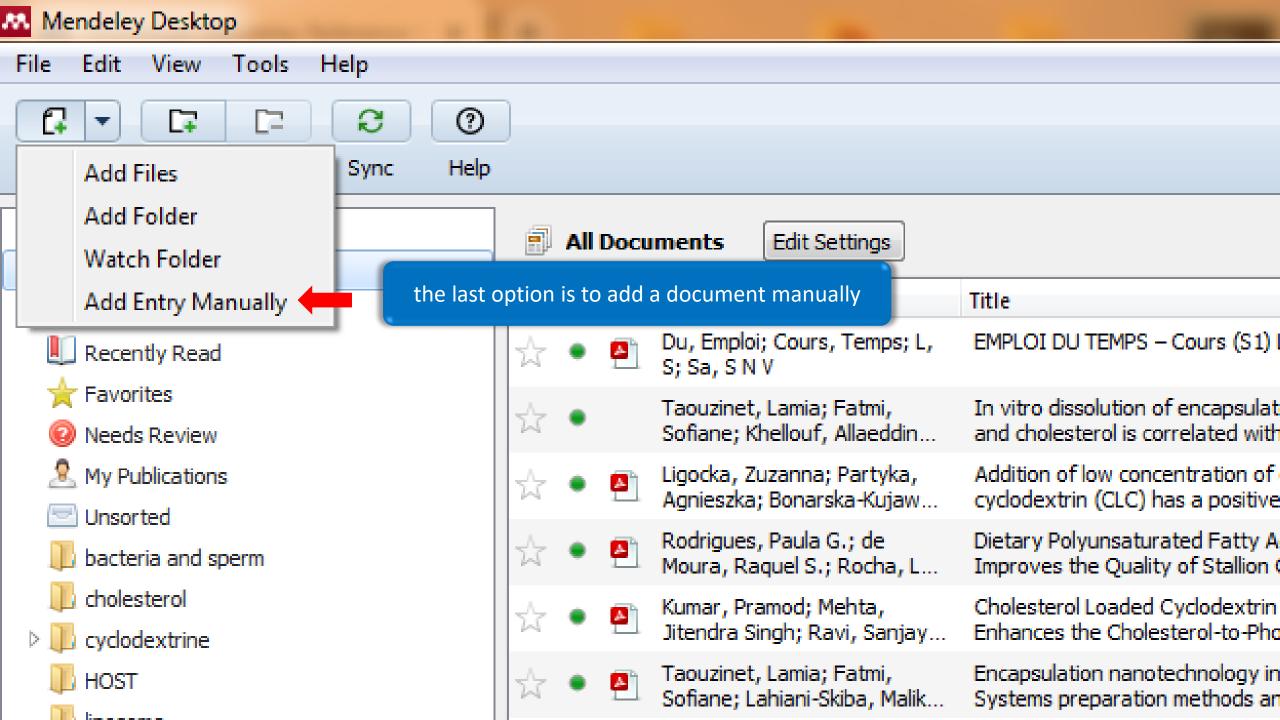


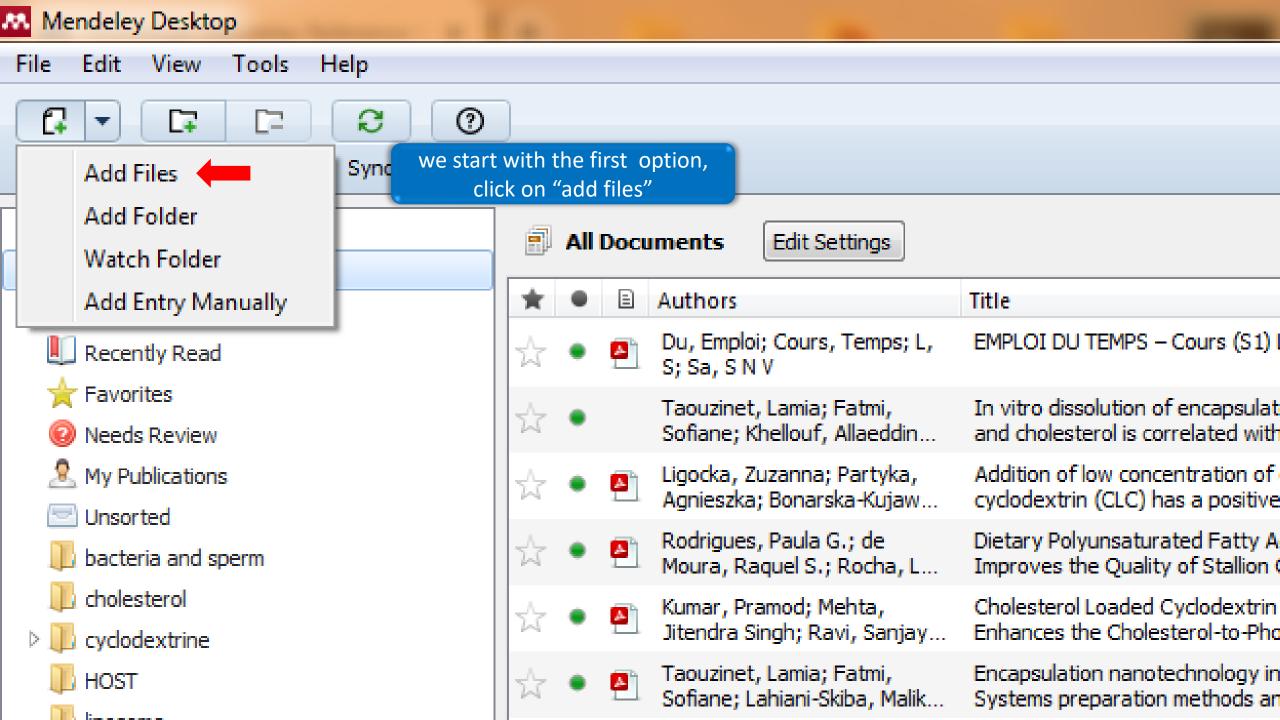


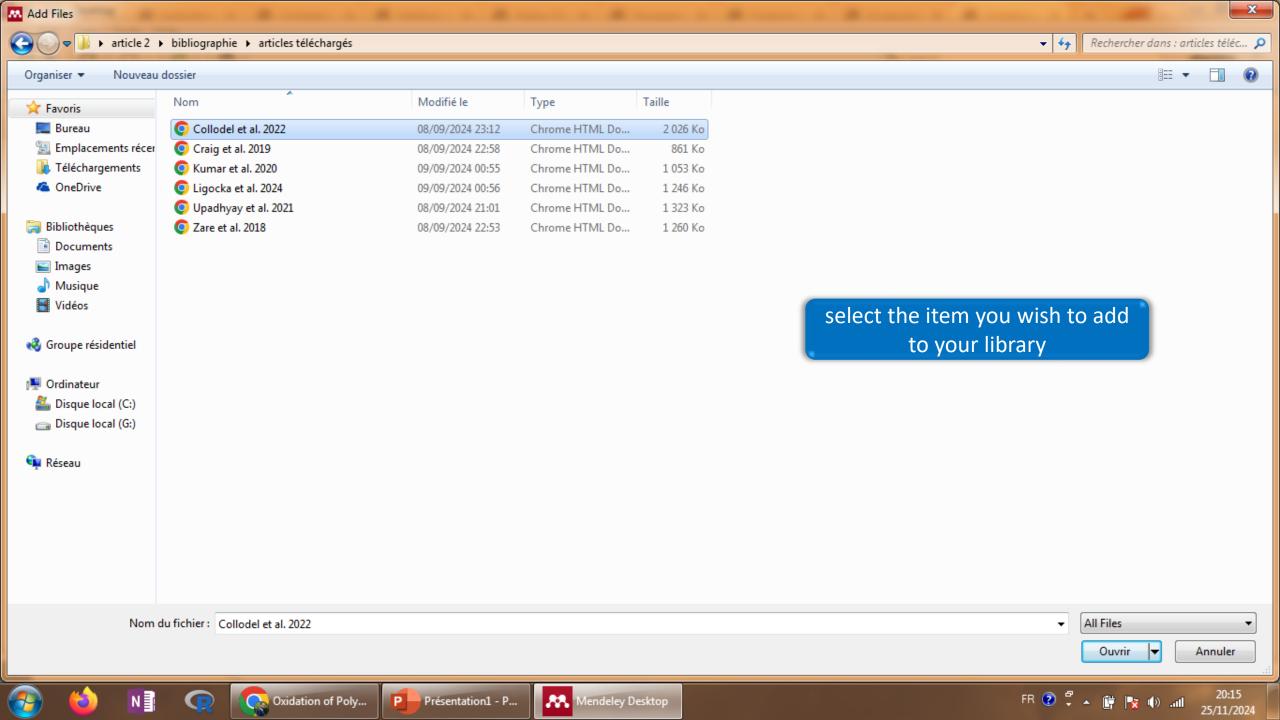


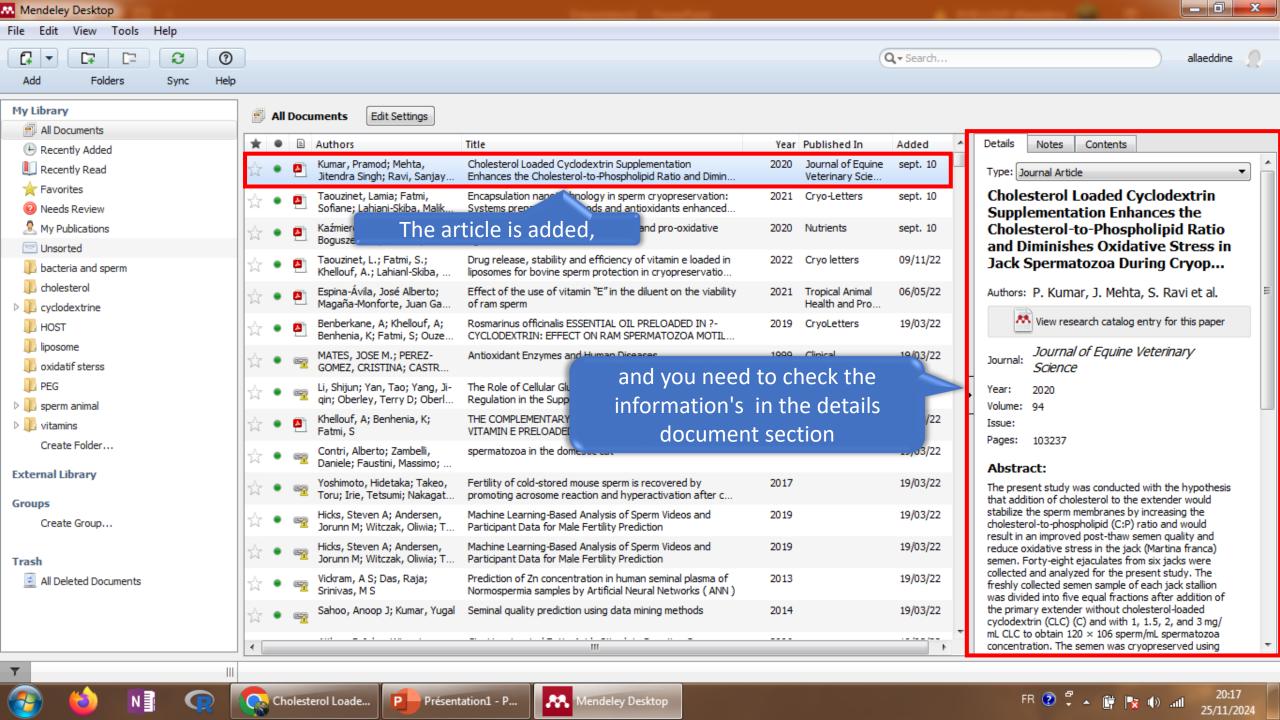


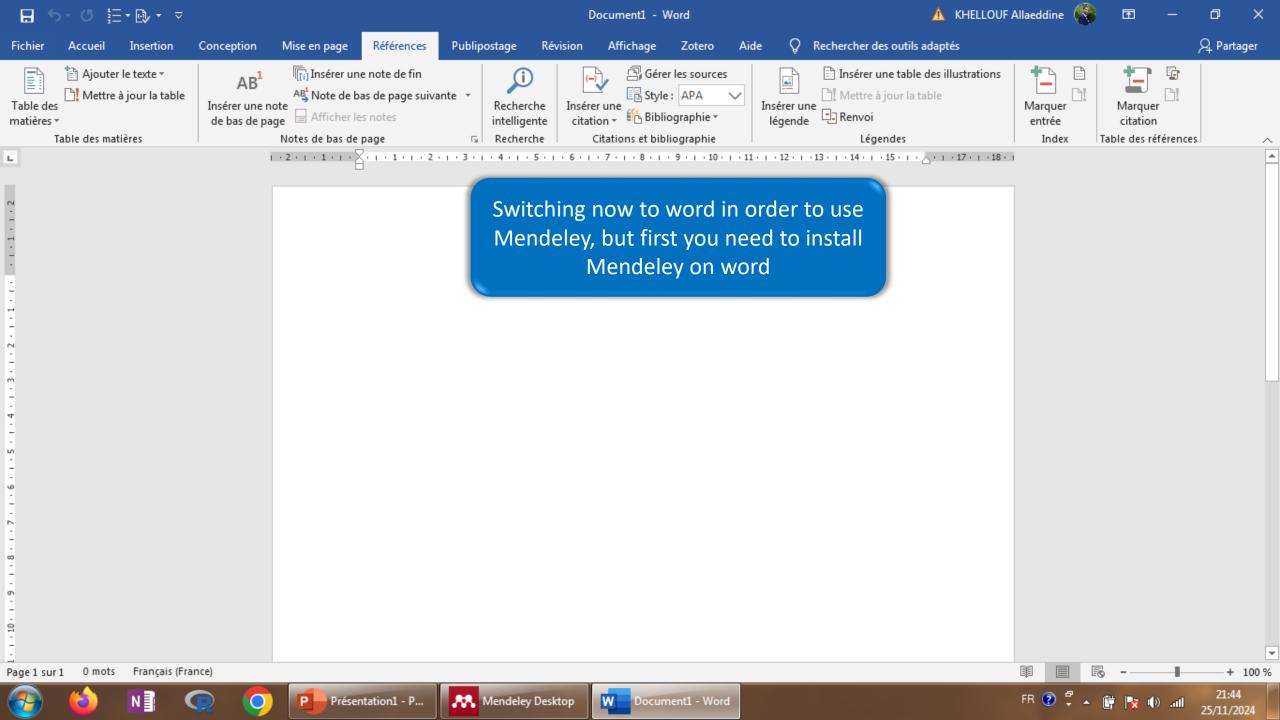


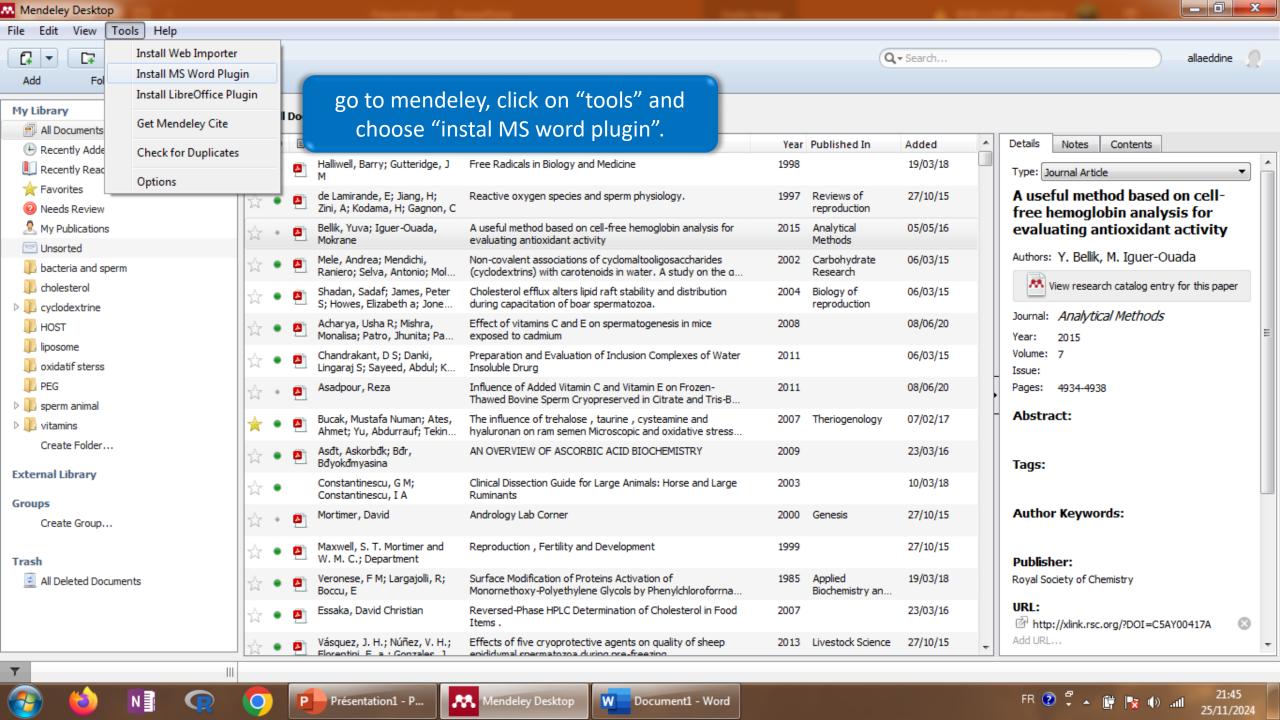


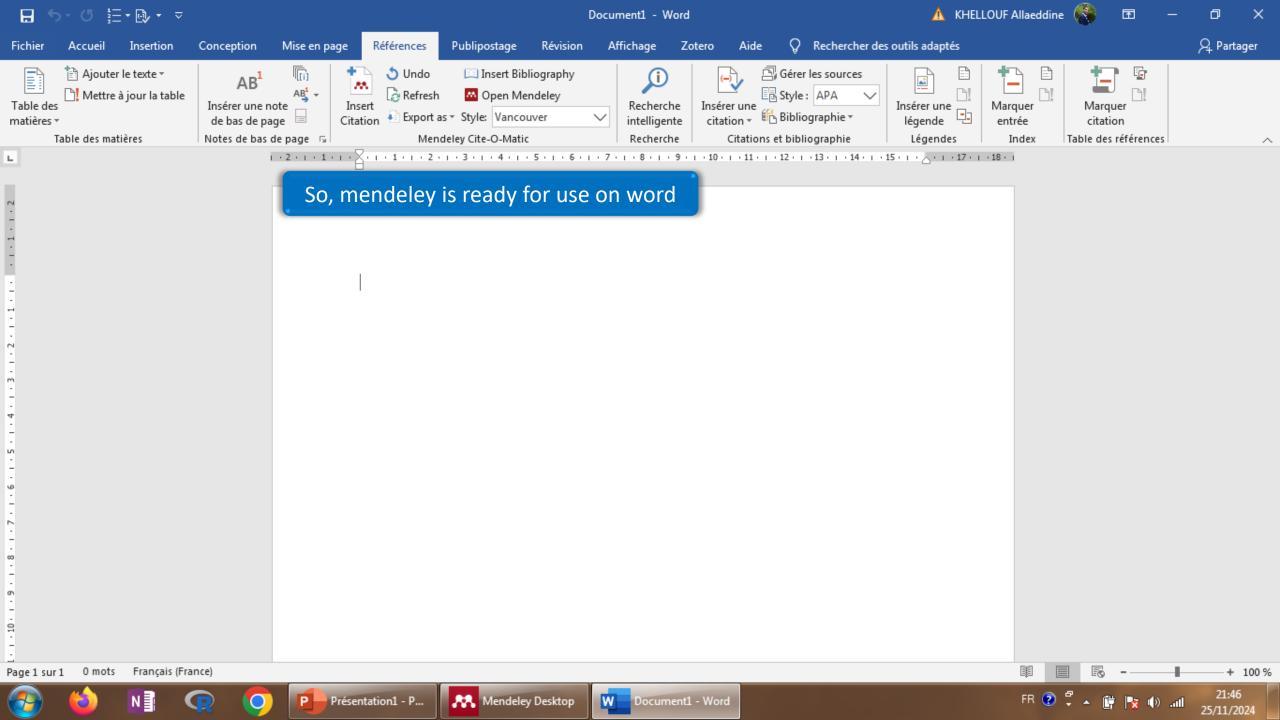


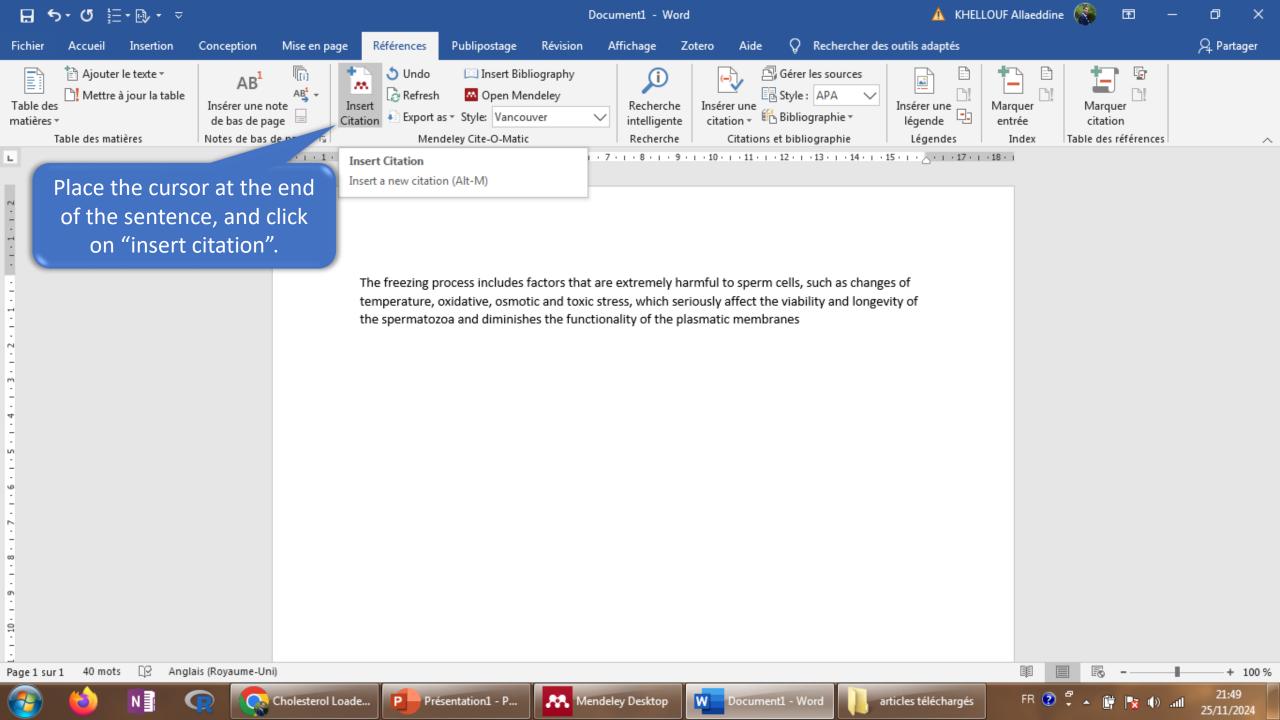


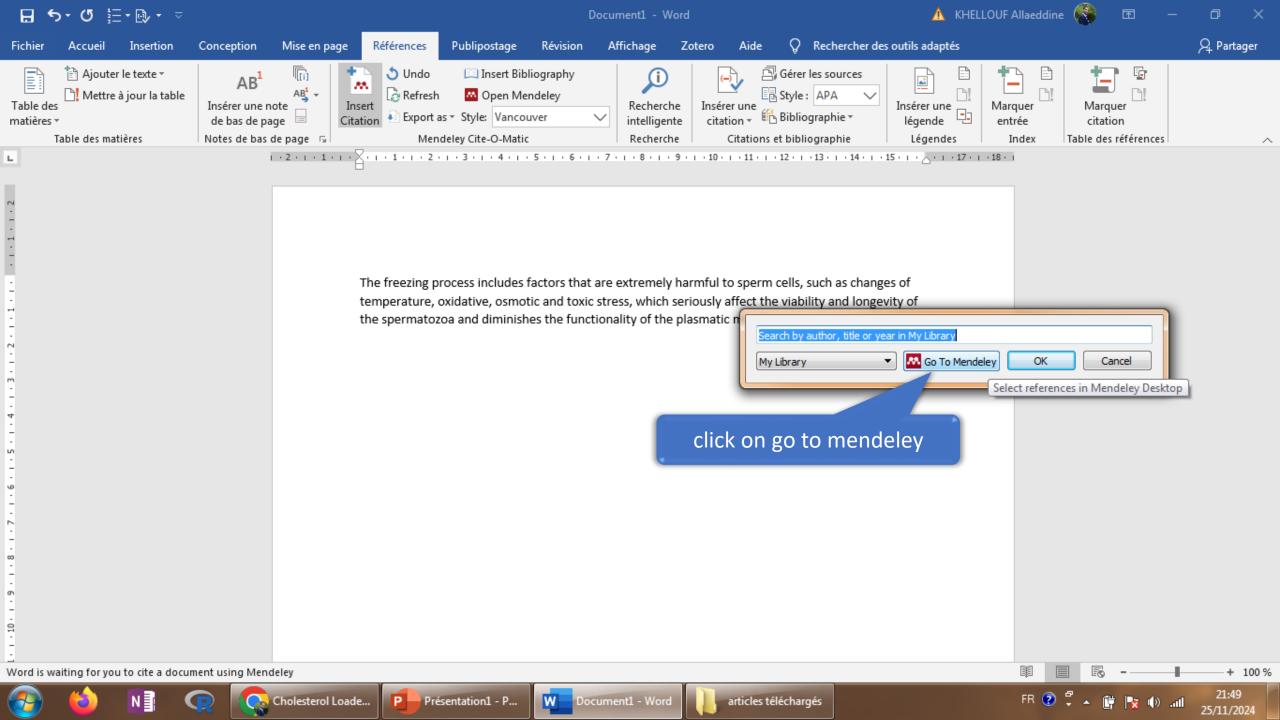


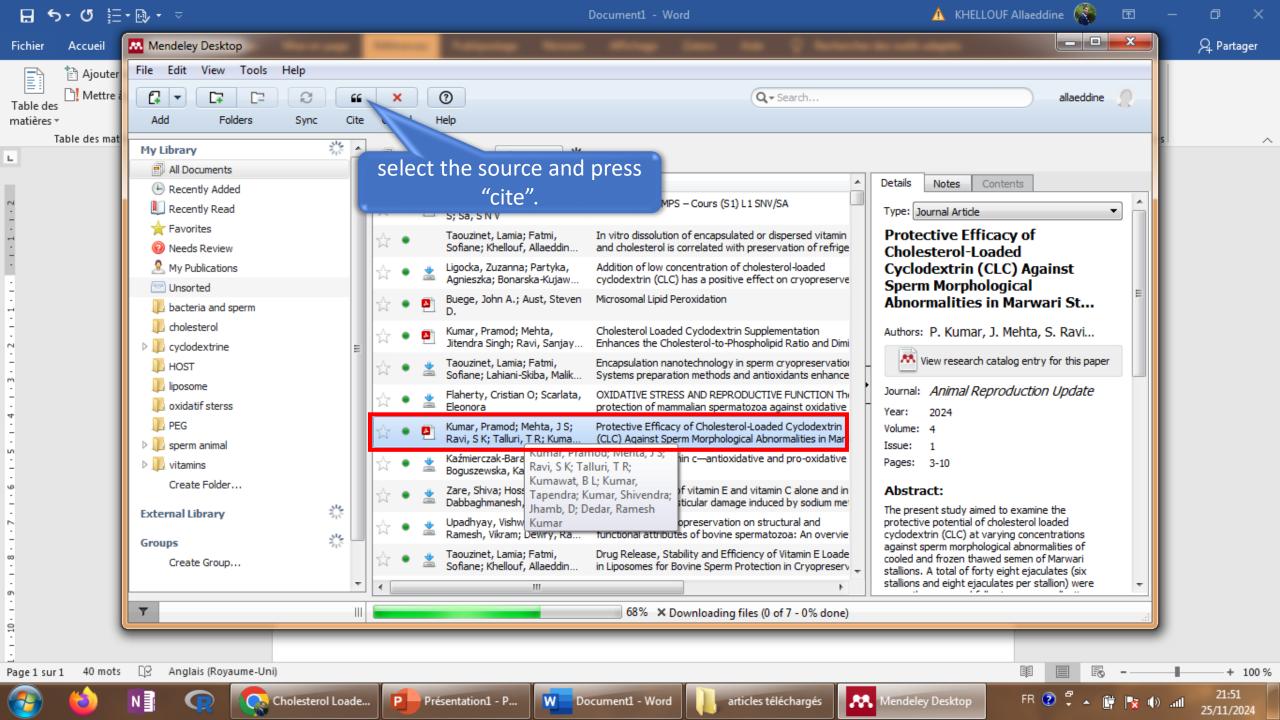


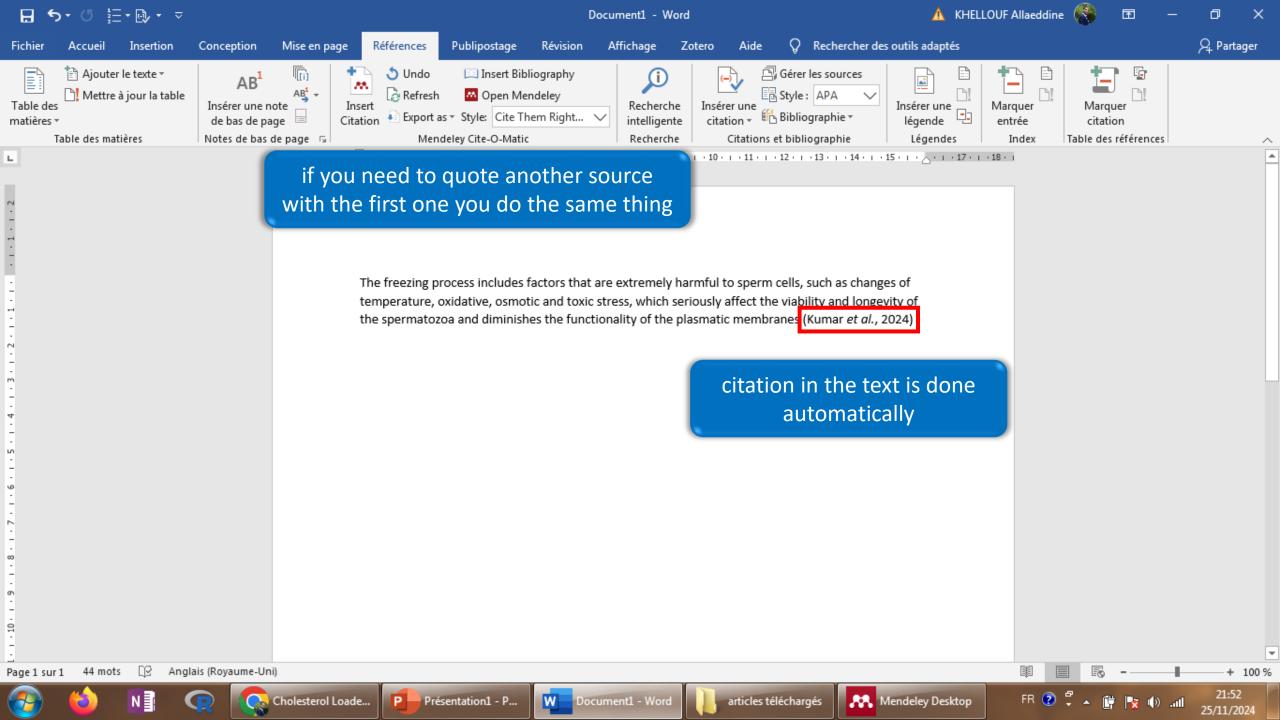


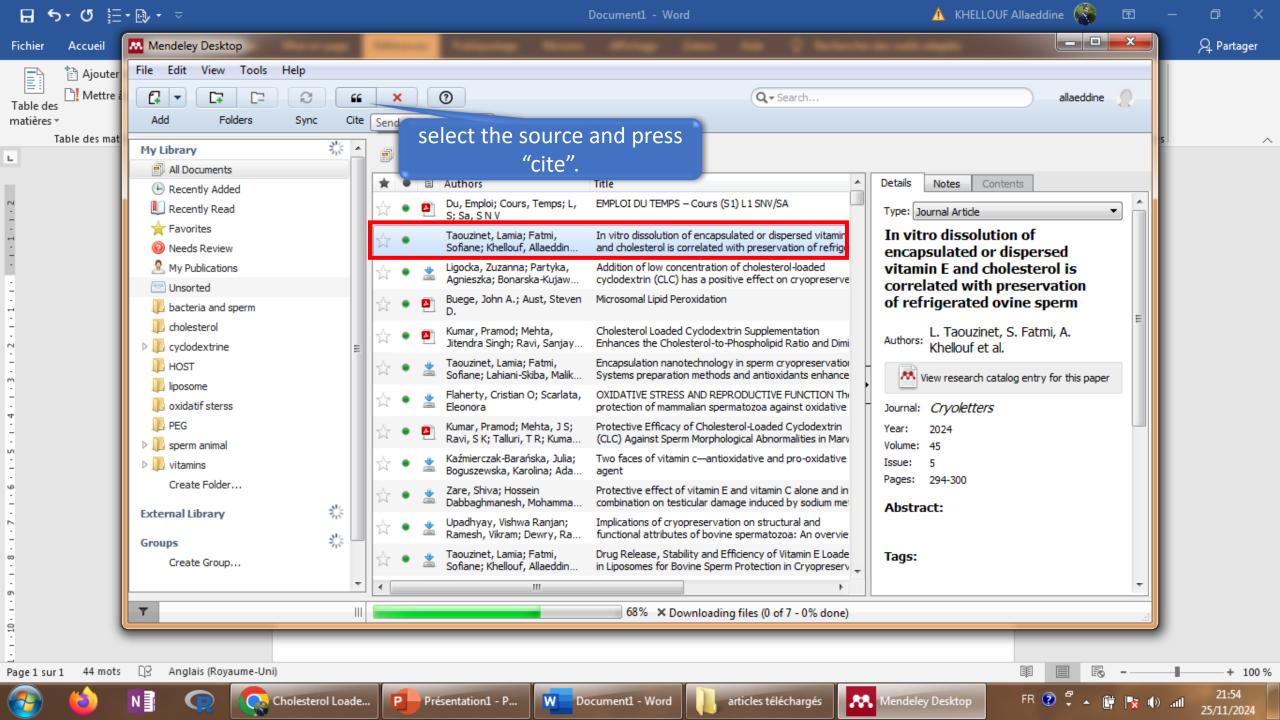


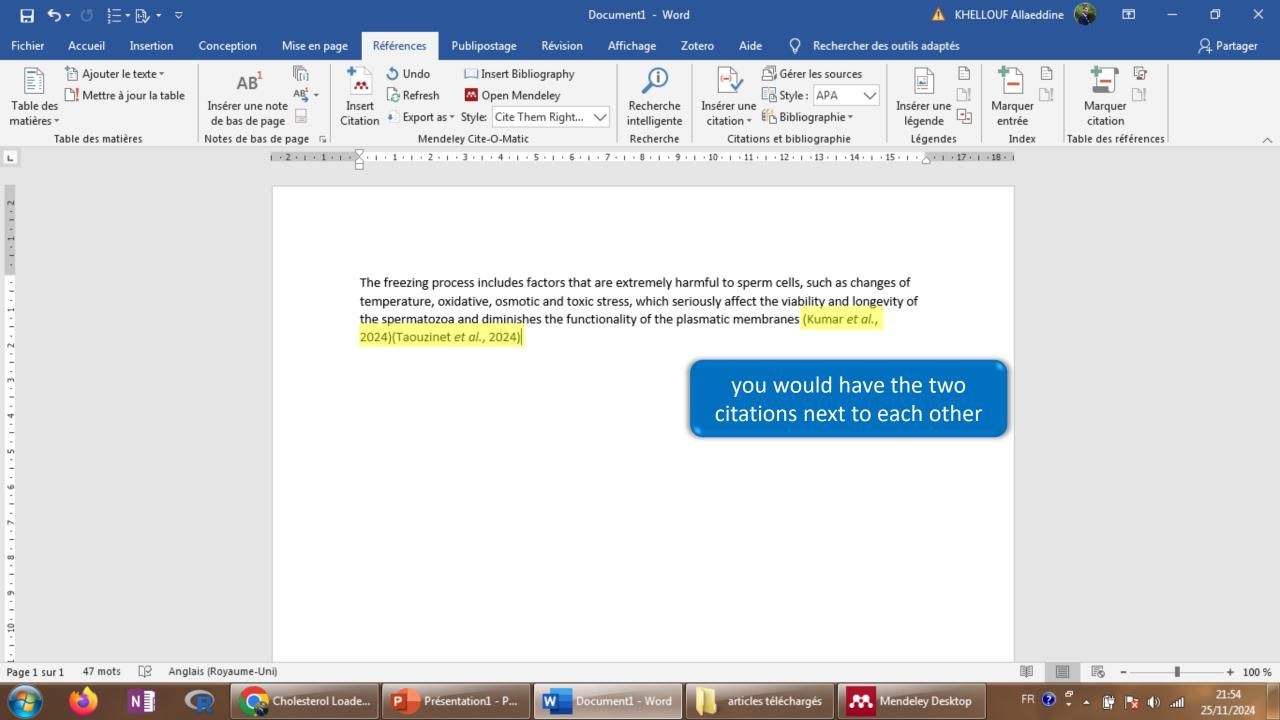


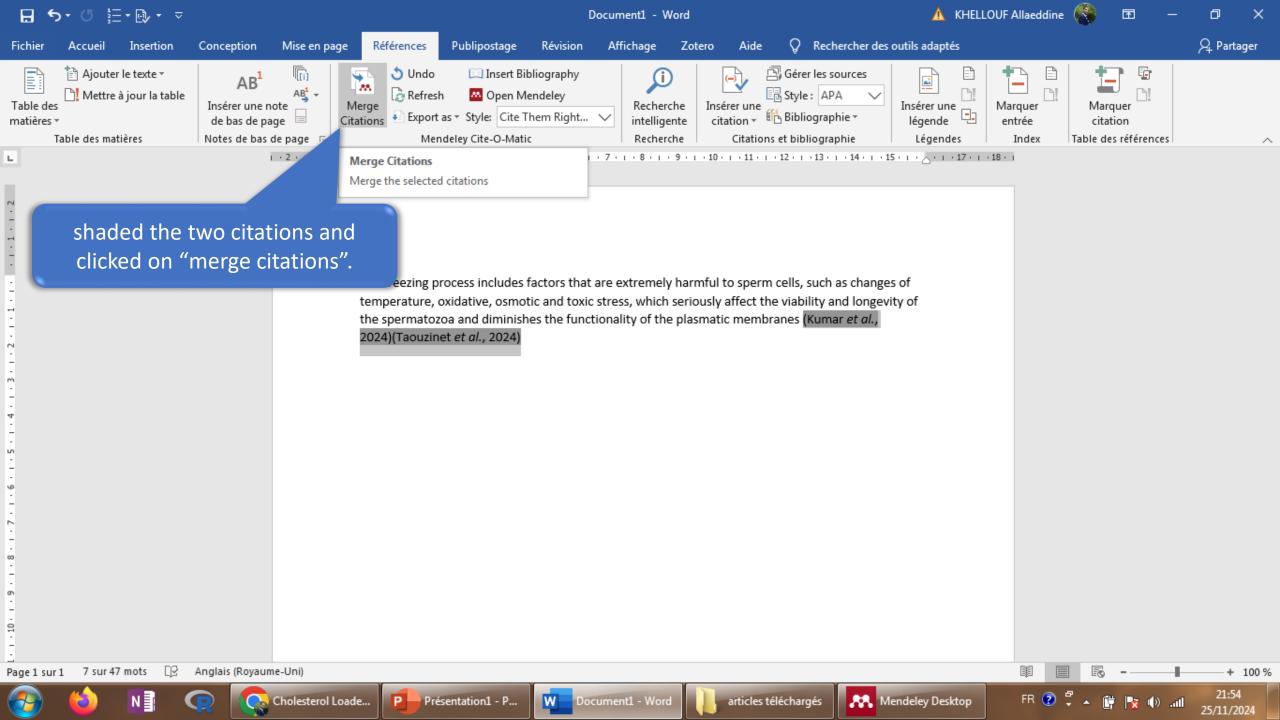


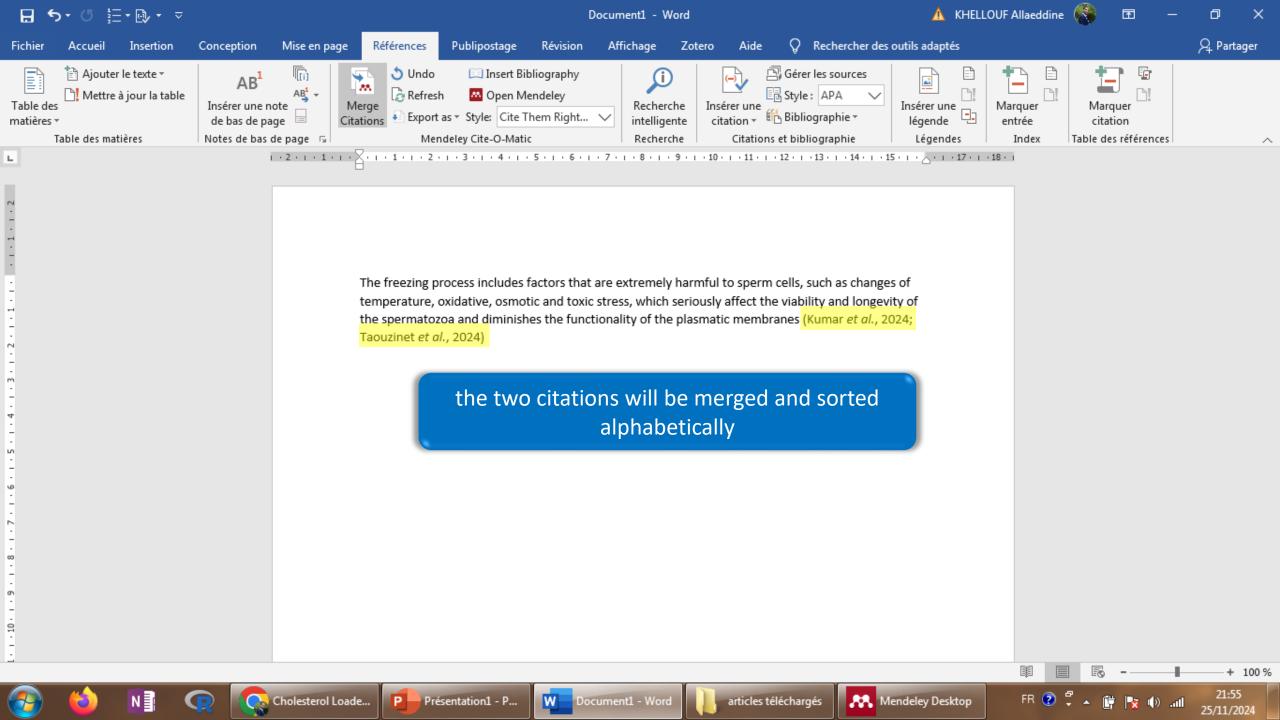


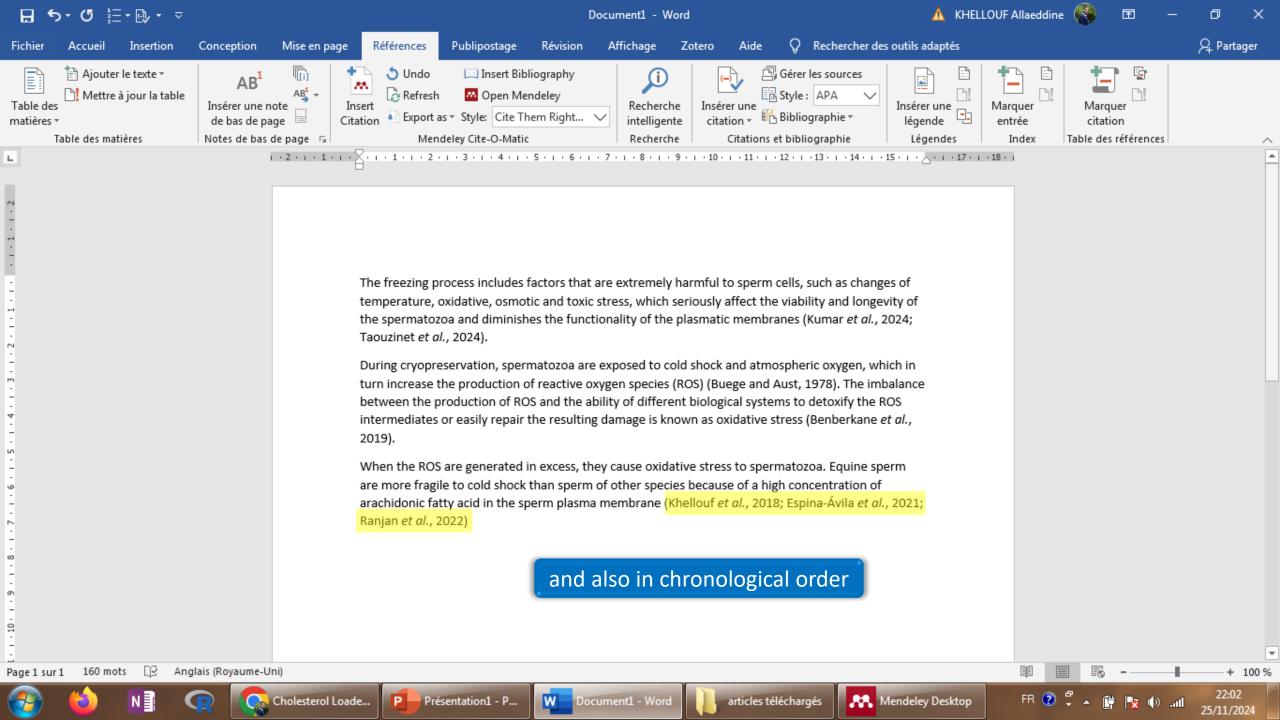


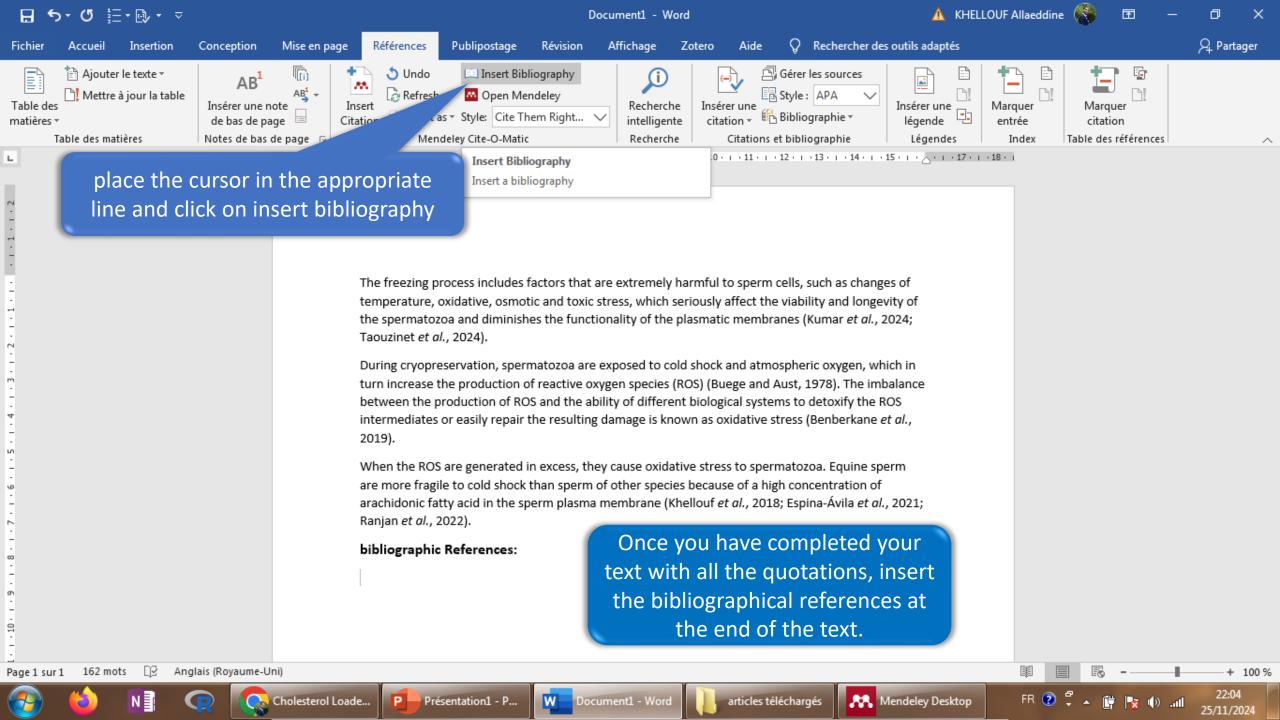












The freezing process includes factors that are extremely harmful to sperm cells, such as changes of temperature, oxidative, osmotic and toxic stress, which seriously affect the viability and longevity of the spermatozoa and diminishes the functionality of the plasmatic membranes (Kumar *et al.*, 2024; Taouzinet *et al.*, 2024).

During cryopreservation, spermatozoa are exposed to cold shock and atmospheric oxygen, which in turn increase the production of reactive oxygen species (ROS) (Buege and Aust, 1978). The imbalance between the production of ROS and the ability of different biological systems to detoxify the ROS intermediates or easily repair the resulting damage is known as oxidative stress (Benberkane *et al.*, 2019).

When the ROS are generated in excess, they cause oxidative stress to spermatozoa. Equine sperm are more fragile to cold shock than sperm of other species because of a high concentration of arachidonic fatty acid in the sperm plasma membrane (Khellouf *et al.*, 2018; Espina-Ávila *et al.*, 2021; Ranjan *et al.*, 2022).

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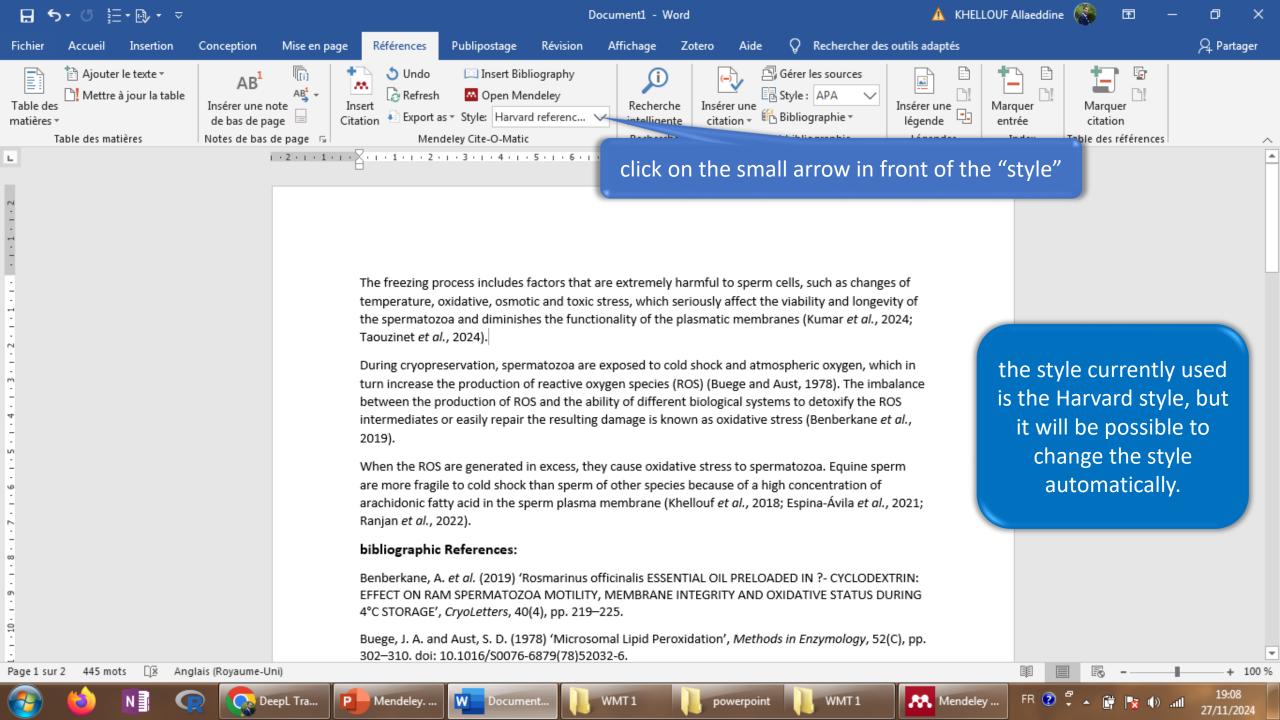
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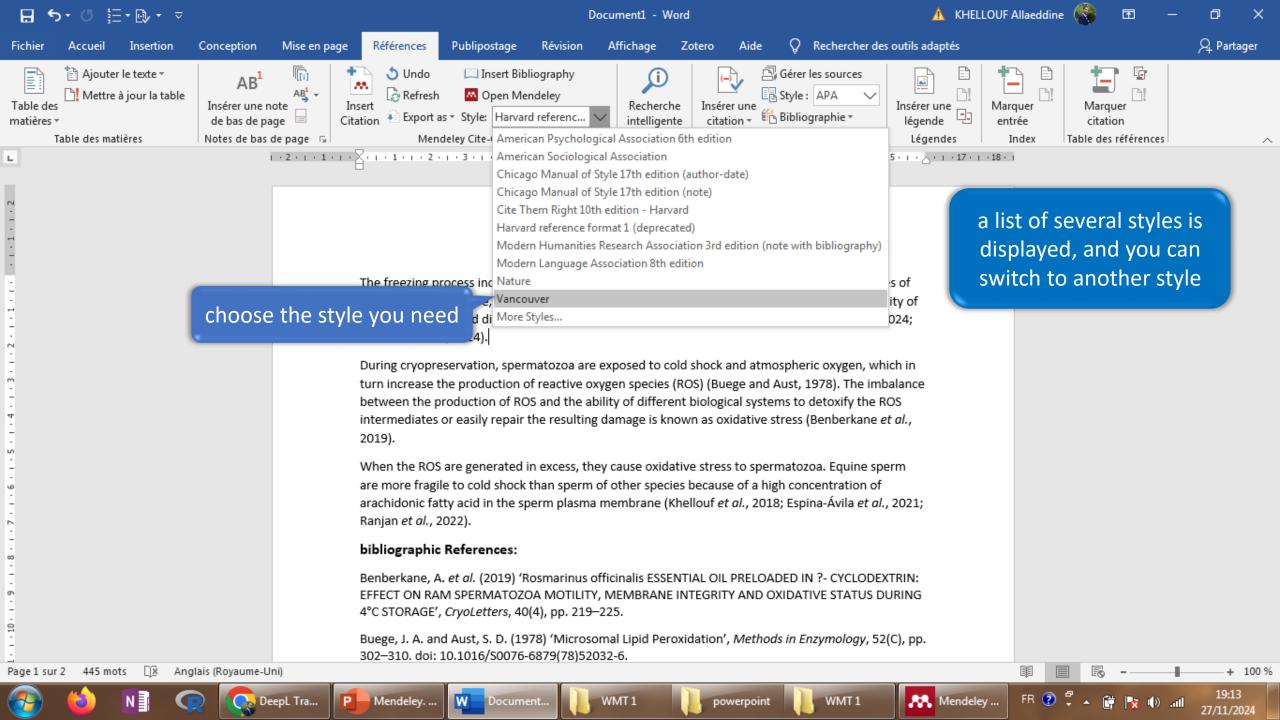
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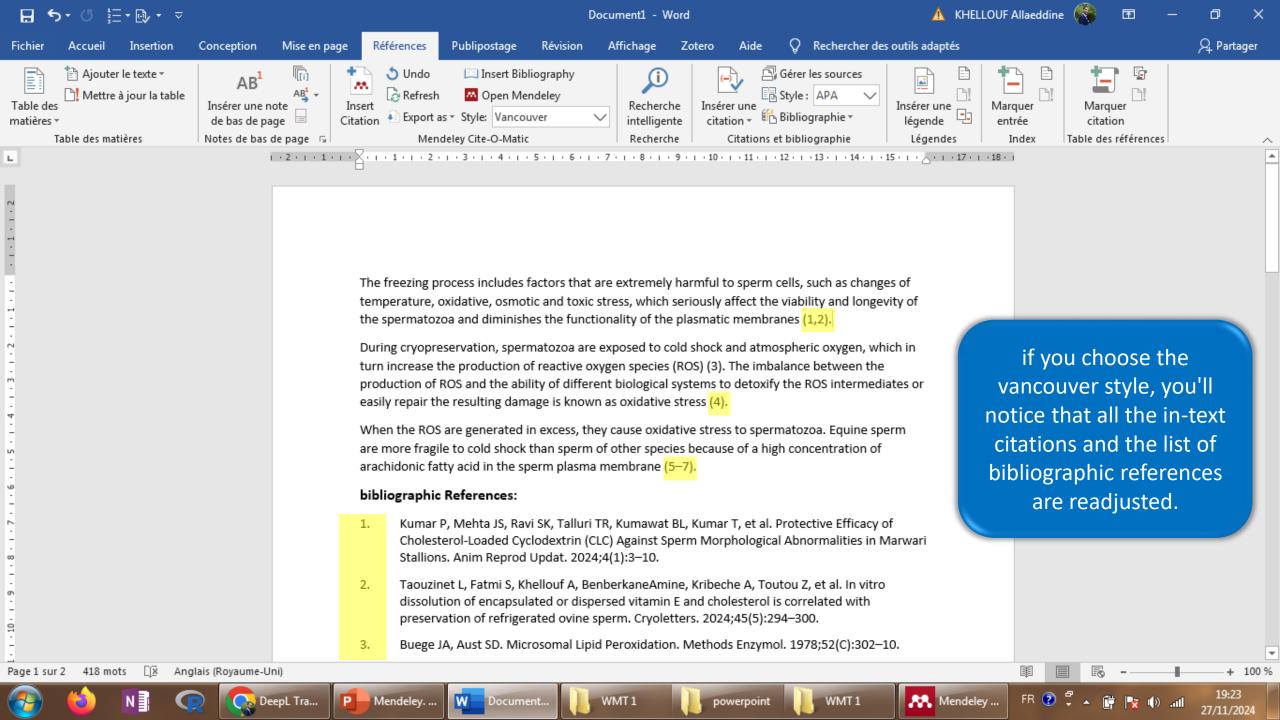
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The freezing process includes factors that are extremely harmful to sperm cells, such as changes of temperature, oxidative, osmotic and toxic stress, which seriously affect the viability and longevity of the spermatozoa and diminishes the functionality of the plasmatic membranes (1,2).

During cryopreservation, spermatozoa are exposed to cold shock and atmospheric oxygen, which in turn increase the production of reactive oxygen species (ROS) (3). The imbalance between the production of ROS and the ability of different biological systems to detoxify the ROS intermediates or easily repair the resulting damage is known as oxidative stress (4).

When the ROS are generated in excess, they cause oxidative stress to spermatozoa. Equine sperm are more fragile to cold shock than sperm of other species because of a high concentration of arachidonic fatty acid in the sperm plasma membrane (5–7).

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