

Review Form2

Book Name:	Research Perspectives of Microbiology and Biotechnology
Manuscript Number:	Ms_BPR_2625
Title of the Manuscript:	BIOMECHANICS OF URINARY BLADDER: SLOW-FILLING AND SLOW-EMPTYING CYSTOMETRY AND ACCOMMODATION EXPLAINED BY SLIDING FILAMENTS MODEL
Type of the Article	Book Chapter

PART 1: Review Comments

Compulsory REVISION comments	Reviewer's comment	Author's Feedback(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimumof 3-4 sentences may be required for this part.	Yes, Slow involuntary emptying of unstimulated pig bladders in vitro via resistance to flow and discuss the results regarding the generation of spontaneous contractile activity and the role in the dynamic adaptation of detrusor pressure to bladder volume. How? Discuss it? 2-. The transient character of spontaneous contractions is crucial for maintaining a stable state of the bladder. How? Discuss it? 3- Discuss the following statement "The volume of the bladder V is almost separable into the elastic volume VE and the resting volume VR. In the ratio of the accommodative state VE / VR. It depends on the mechanical state of the bladder tissue, which is determined by its history of elongation and contraction" 4- The changing mechanical state of the tissue, which is expressed in particular in the variable elastic compliance CE, is explained by a network representing the mechanical states of the sliding filaments in the smooth muscle cells of the bladder tissue. How? Explain it? 5- When adding a small amount of fluid + ΔV to a bladder filled with volume V, we obtain an increase in detrusor pressure + Δpd. How? 6- Discuss the following statement "When a small amount of fluid -ΔV is rapidly excreted, the pressure drop -Δpd is followed by a gradual increase, referred to as pressure recovery, and ends at a pressure slightly lower than before excretion." 7- Pressure relaxation is understood as a passive viscoelastic response of the bladder, while pressure recovery is understood as an active muscular response of the bladder. What is the analysis based on? 8- Relaxation and recovery take time to end at a detrusor pressure that adapts to the changing volume. What is your estimate of the time? 9- When we empty the bladder gradually slowly enough for active recovery to adapt the activated detrusor to the decreasing volume, we also expect a continuously adaptive state of the bladder and hence pressure relaxation and recovery can be understood as	

	antagonistic processes in correcting detrusor pressure after a small change in volume ΔV. Explain briefly? 10- Discuss the following statement "The accommodation state is presented as a state of equilibrium between distributed passive elongation and distributed spontaneous active contraction or micro movements (MMs). This dynamic process of accommodation is assumed to be active during slow filling of the bladder in standard cystometry, but also during slow emptying." 11- The tonic detrusor pressure is determined by the elastic elongated state of the bladder wall. Why? Explain the reason 12- Discuss the following statement "The mechanical properties of a circumferential strip of the bladder wall are represented by this model as a sequential arrangement of a sequential elastic element (SEE) and a plasto-contractile element (PCE). According to this model, an increase in detrusor pressure, as in slow cystometry, is accompanied by an increase in plastic elongation of the bladder wall, through the plastic aspect of the PCE." 13- The plastic elongated state of the bladder is taken to be equal to the resting volume V_R of the bladder. Why? Explain the reason 14- According to the model, total bladder volume $V = V_E + V_R$. Plastic elongation occurs due to stress in the bladder wall. Explain? 15- Shortening of the stretched plastic state occurs due to muscle contraction, through the contractile side of the PCE. Plastic elongation is a specific type of viscous elongation that is limited by a threshold value in stress. The stretched plastic state does not change negatively when the load is less than the threshold value. Discuss this? 16- Plastic elongation increases further only when the threshold value is exceeded. Explain this? 17- Elastic elongation is limited by the load and recovers immediately when the load decreases. Conversely, plastic elongation maintains its reached stretched state when the load decreases. Why? Explain this briefly? 18- During physiological filling of the bladder and in standard clinical slow cystometry (usually <1 ml/sec) to a volume V of about 300 ml, the recorded detrusor pressure p_d is low. Why? 19- Discuss the following statement "The bladder work cycle includes a collection phase, with a slow increase in bladder volume, and an evacuation phase with a rapid decrease in volume." 20- The p-V relationship is achieved in the evacuation phase by neural stimulation of contraction of the smooth muscle component of the bladder wall. How is the neural stimulation achieved? How many methods and types?	
--	---	--

Review Form2

	21- After the evacuation of the remaining volume VR is completed, what is the value of the volume? 22- The actual detrusor pressure pd is determined by the actual elastic volume VE in combination with the elastic compliance CE. How do you explain this? 23- The ratio of the tension across the circumferential band and the elastic elongation relative to the resting length is expressed by the elastic parameter E. For bladder tissue, E has a gradually increasing value with elongation, meaning that the tissue is stiffer in a more elastic state of elongation. Explain it? 24- When the bladder is stimulated to contract while keeping its volume constant, the detrusor pressure increases significantly. Why explain this? 25- The increased detrusor pressure recording of the stimulated isovolumetric bladder can be used to derive bladder contractility, i.e. to derive CE characteristics as part of PCE. How do you explain this? 26- If the researcher is asked to improve the results, what changes are made? 27- Discuss the following statement "The increased pressure in stimulated isovolumetric bladder characteristics is mostly due to decreased elastic compliance CE rather than increased VE accompanied by decreased VR. The decreased CE by contraction means that SEE characteristics are not constant but variable". 28- We need to study this specific effect of spontaneous contractions on elastic compliance in conjunction with the concept of adaptation. Are there other similar methods or techniques and how can I mention them?	
Is the title of the article suitable? (If not please suggest an alternative title)	yes	
Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.	Yes 29- Fresh pig bladders were obtained from the local slaughterhouse and immersed in a tank with modified Krebs solution aerated with a mixture of 95% O2 and 5% CO2 and maintained at 37°C. Why were pig bladders specifically chosen? 30- Discuss the following statement: "According to the concept of accommodation, extreme low-amplitude differences in detrusor pressure and micro-movements MM in the bladder wall are relevant so we want to record much smaller pressure differences in the bladder than typically occurs in clinical settings." 31- In this stage, the bladder was slowly filled (about 1 ml/sec) by adding 100 ml of metabolic fluid at 37°C via the cock. What is the name of the stage?	
Are subsections and structure of the manuscript appropriate?	Yes	

Review Form2

Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.	32- To allow the detrusor pressure to accommodate/adapt to the larger volume, in stage 2 about 4 minutes were waited before involuntary expulsion began in the next stage. What is the name of the stage? 33- The expulsions are completed when the detrusor pressure $p_d(t)$ becomes equal to the hydrodynamic pressure difference. How did you explain this? 34- Discuss the following statement "When the final pressure is in dynamic equilibrium. Fluctuations in F do not appear in the variation of $V_e(t)$ because they are damped by the total time constant of the fluid collection system." 35- The portion $V_{et}(t)$ of the total expelled volume V_e, which is expelled only by the tonic component, is separated from the other portion $V_{ew}(t)$ which is expelled only by the variable undulating pressure component. How did you explain this? 36- It is clear that a large portion of the total recorded volume expelled V_e (final) cannot be attributed to expulsion by the activated pressure component $p_{bt}(t)$. Why explain the reason? 37- Discuss the following statement "We need to account for two major sources of error that may contribute to the large variability in the calculated CE values. One source relates to the spontaneous nature of contraction activity, which limits the number of points available to fit the single exponential function." 38- A pressure wave is caused by contraction of the muscular component of the bladder wall. The excess volume is expelled by the pressure wave due to compensatory elastic elongation elsewhere in the bladder wall. How do you explain this? 39- Discuss the following statement "In a completely transient contraction, the additional elastic compensation is completely transient so that the net elastic volume V_E of an equal-volume bladder is not changed by a completely transient contraction wave." 40- After a non-transient contraction, the local stretched plastic state of the wall is smaller than it was before the contraction. Why explain the reason? 41- Discuss the following statement "Transient and incomplete contractions are also generated during the reduction of the elastic volume $V_E(t)$ in involuntary expulsion." 42- During involuntary expulsion, the elastic volume V_E decreases gradually, but the resting volume V_R decreases gradually i.e. after each transient pressure wave. How do you explain it? 43- The continuous reduction of the elastic volume and the gradual reduction of the resting volume are identified between the numbered data points in Fig. 5. With the known time constant τ, we computed the total volume $V_{et}(t)$, which is expelled at the data points by the exponentially decaying pressure component. Briefly discuss it? 44- Discuss the following statement "The phenomenon of activated pressure drop at data points is determined only by the elastic volume V_E and elastic compliance CE,	
--	--	--

Review Form2

	while the total volume decreases more than the elastic volume by reducing the resting volume VR, taken as a characteristic of the spontaneous active bladder" 45- The involuntary property of the bladder of dynamic accommodation is a relevant point of difference with the mechanics of the elastic balloon, and is often used as a simple model of the bladder. How do you explain this? 46- In the balloon and the bladder, a transient local contraction state of the wall is recovered by the pressure generated by the current elastic stretched state of the entire wall. How do you explain this?	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. -	Yes. Please add 5 modern references at last 5 years	
Minor REVISION comments Is the language/English quality of the article suitable for scholarly communications?	Yes	
Optional/General comments	47- In the bladder, the recovered state of the region after a transient contraction is determined by the plastic elongation, which is fixed at the maximum value of the stress. How do you prove this? 48- What are the important conditions for the contraction to be completely transient? Mention them? 49- While small, distributed, spontaneous contractions and MM allow dynamic adaptation of detrusor pressure to bladder volume, it is important that these contraction waves are completely transient. Why explain this? 50- Discuss the following statement: "Elastic compliance is determined by the distribution of the resting length of actomyosin chains in the smooth muscle cells of the bladder tissue. This distribution can be changed by elongation and contraction of the bladder tissue." 51- During slow filling and slow emptying of the bladder, the accommodative state can be maintained with dynamically constant elastic compliance. What condition do you state? 52- During slow filling or slow emptying, dynamic adaptation of detrusor pressure can be accompanied by a change in the VE/VR ratio. What is this based on?	

Review Form2

PART 2:

	Reviewer's comment	Author's comment <i>(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

Reviewer Details:

Name:	Qusay Kh. Al_Dulamey
Department, University & Country	College of Science, Mosul University, Iraq