

Susceptibility to hyperthermia treatment through CTCs study

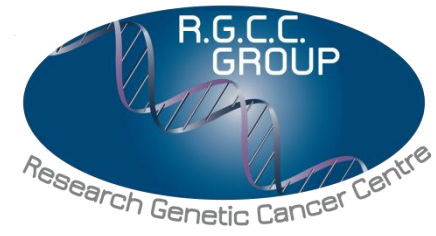
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ESHO 2019 33rd ANNUAL MEETING OF
THE EUROPEAN SOCIETY
FOR HYPERTHERMIC ONCOLOGY

22-24 May 2019
WARSAW

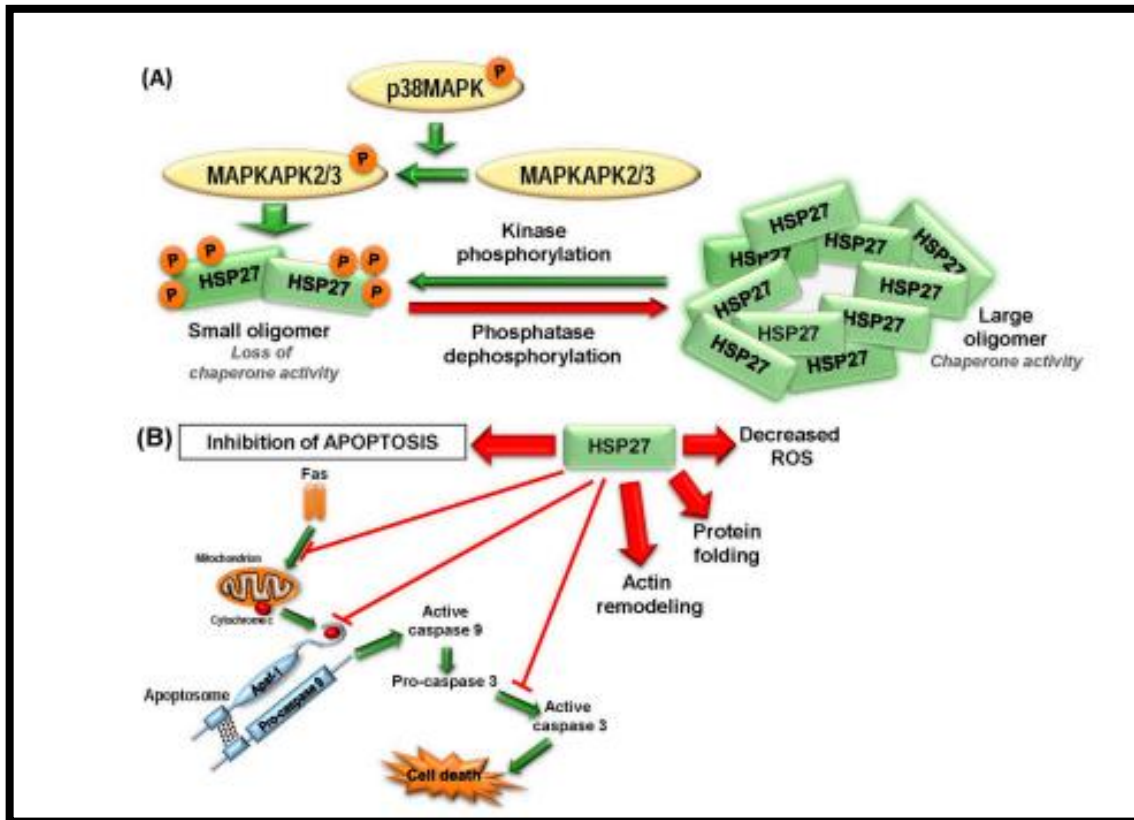


**Liquid Biopsy,
personalized treatment
and response to
Hyperthermia:
Challenges and
Perspectives**

Contents

- **Hyperthermia and Cancer**
 - **Heat Shock Proteins**
- **Liquid biopsy and CTCs**
 - **Study Results**

Heat Shock Proteins

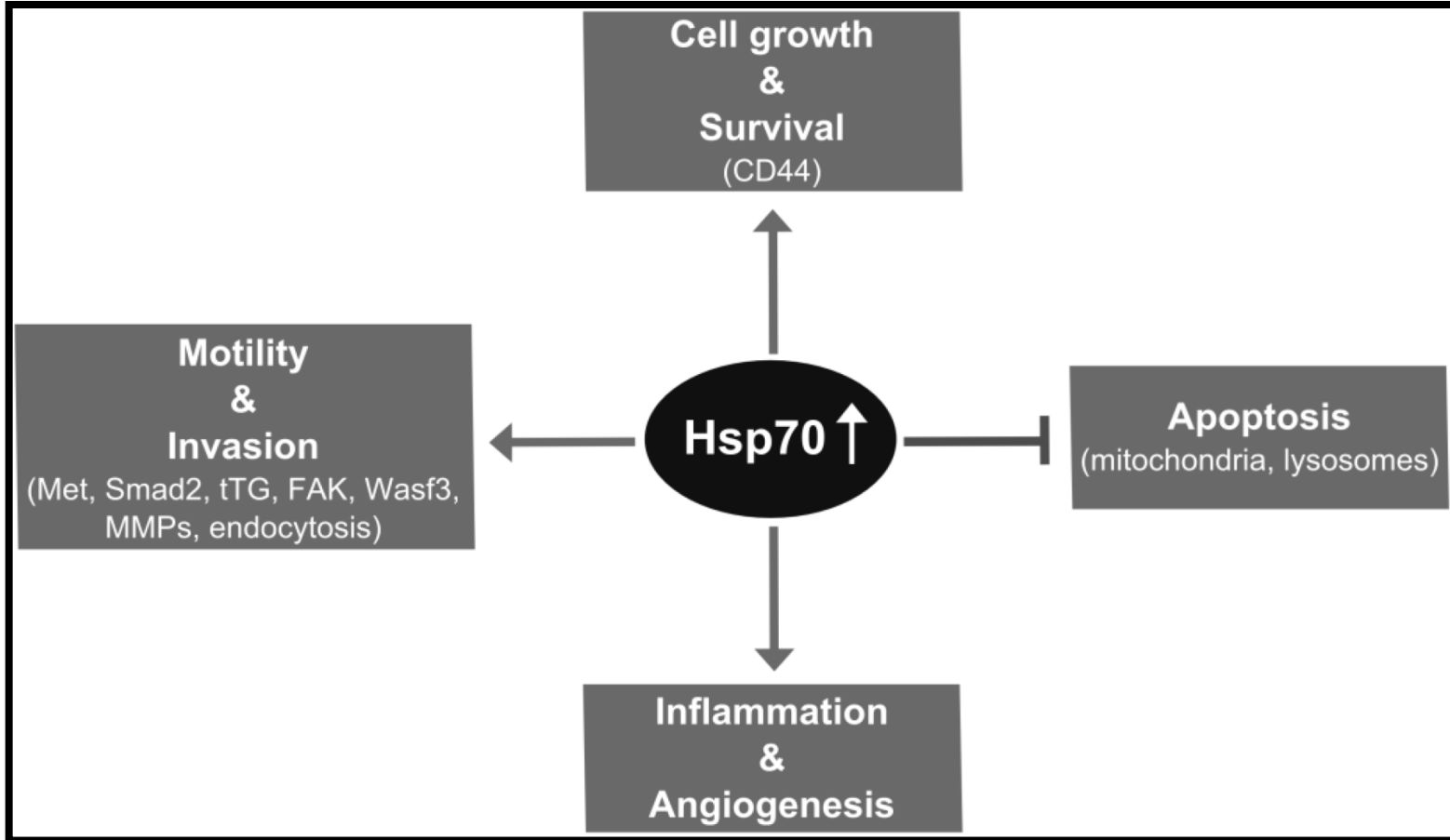


(Chatterjee, Burns Int. J. Mol. Sci. 2017)

HSP27 (HSPB1):
Up-Regulation associated with

- Cancer progression
- Metastasis
- Poor prognosis
- Resistance

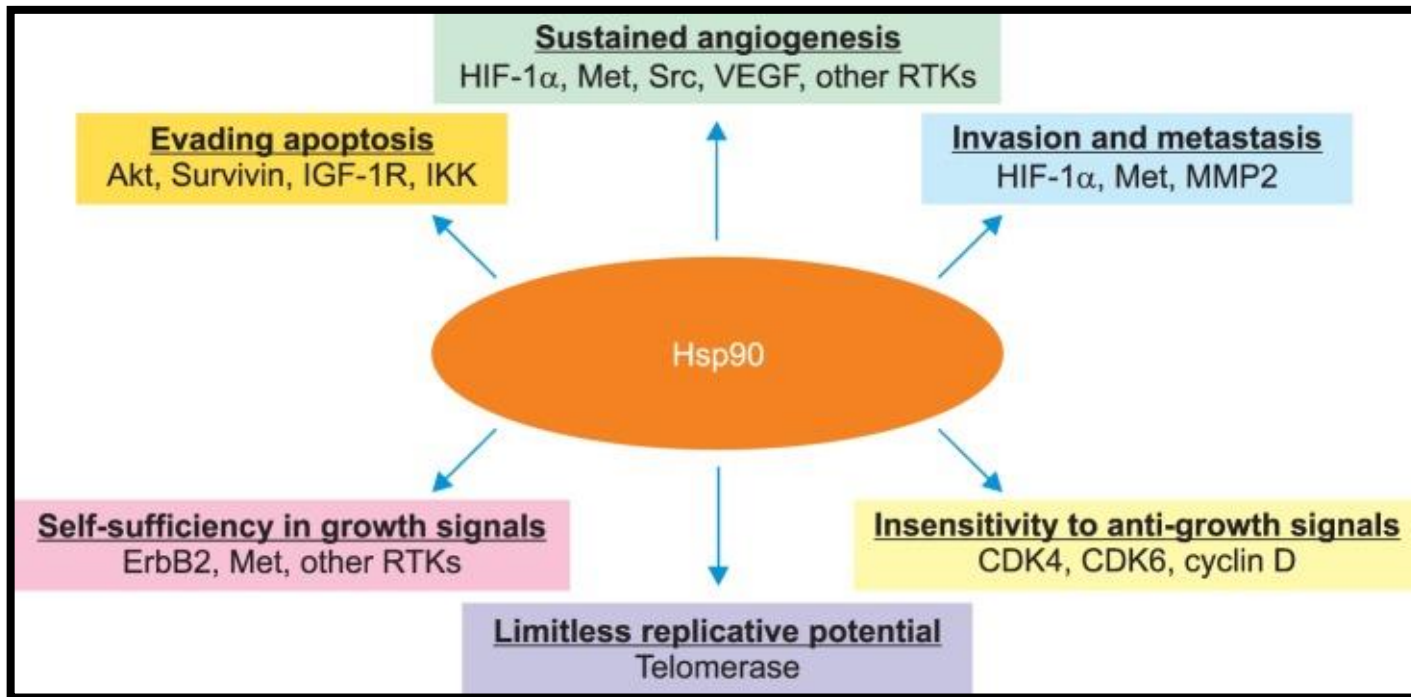
Heat Shock Proteins



HSP70 (HSPA1A):

- Metastasis
- Anti-apoptotic properties

Heat Shock Proteins

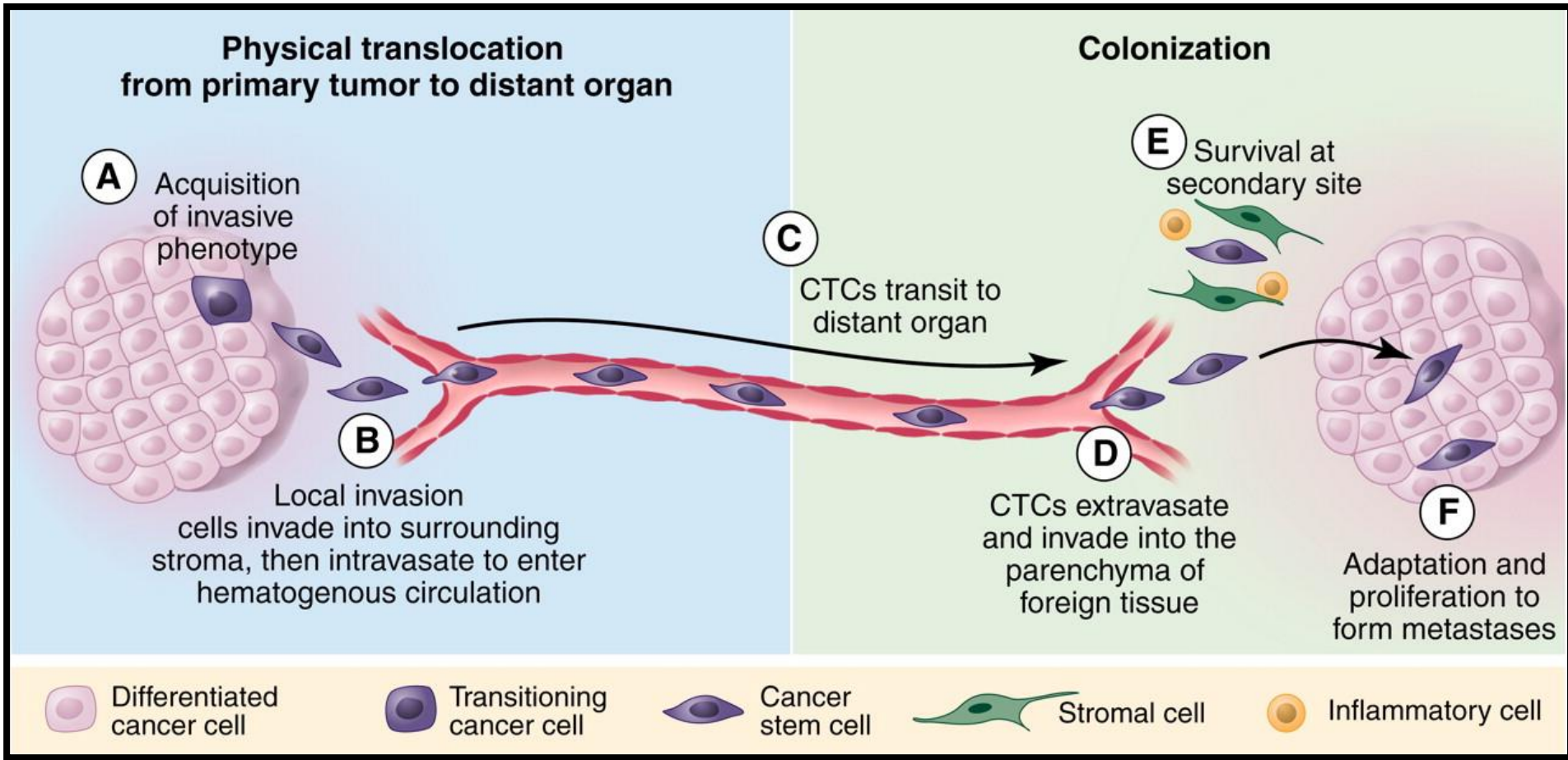


(Eskander, Tewari, Journal of Gynecologic Oncology 2014)

HSP90:

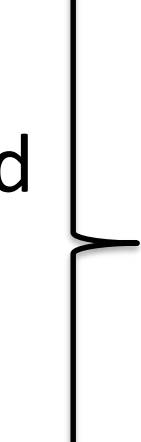
- Implicated in all hallmark traits of cancer

Liquid Biopsy and CTCs



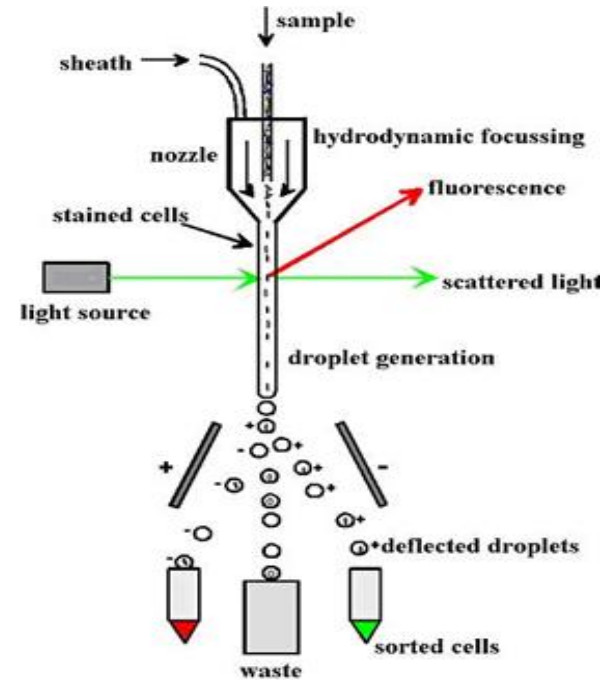
(Chaffer, Weinberg Science, 2011)

Liquid Biopsy-Detection

- Bead-Base method
 - Microscopy-based method
 - Size-based method
 - PCR-based method
- 
- Viability?
 - Purity?
 - Noise?

Liquid Biopsy-Detection

- Using parameters like FS, SS and fluorescence we can detect multiple antigens inside each cell.
- There are two approaches to detect CTCs: positive selection and negative selection.
- FC can provide information about quantity and quality of CTCs



Journal of Cancer Therapy, 2015, 6, 543-553

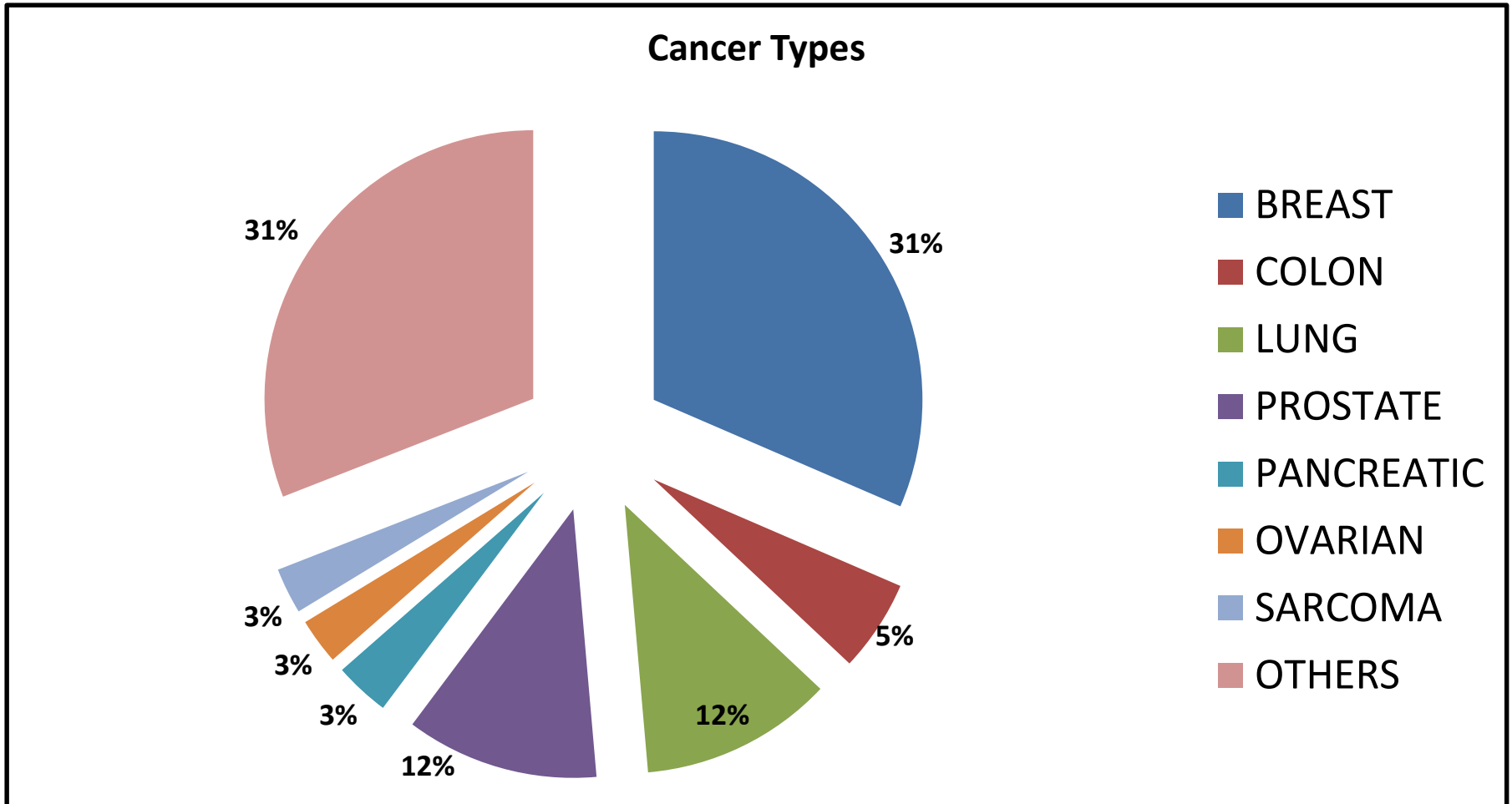
Published Online July 2015 in SciRes. <http://www.scirp.org/journal/jct>

<http://dx.doi.org/10.4236/jct.2015.67059>

5. Conclusion

In conclusion, this study demonstrates that it is possible to detect CTCs with higher sensitivity (86.2%) and specificity (83.9%) compared with routine clinical methodologies. The parameters may vary depending on the antibody panel used; however, using flow cytometry to identify CTCs has proven to be efficient. These results suggest that further studies are required to improve the accuracy by which CTCs and CTC subtypes can be identified by flow cytometry and thereby improve our ability to detect and follow the progression of cancer.

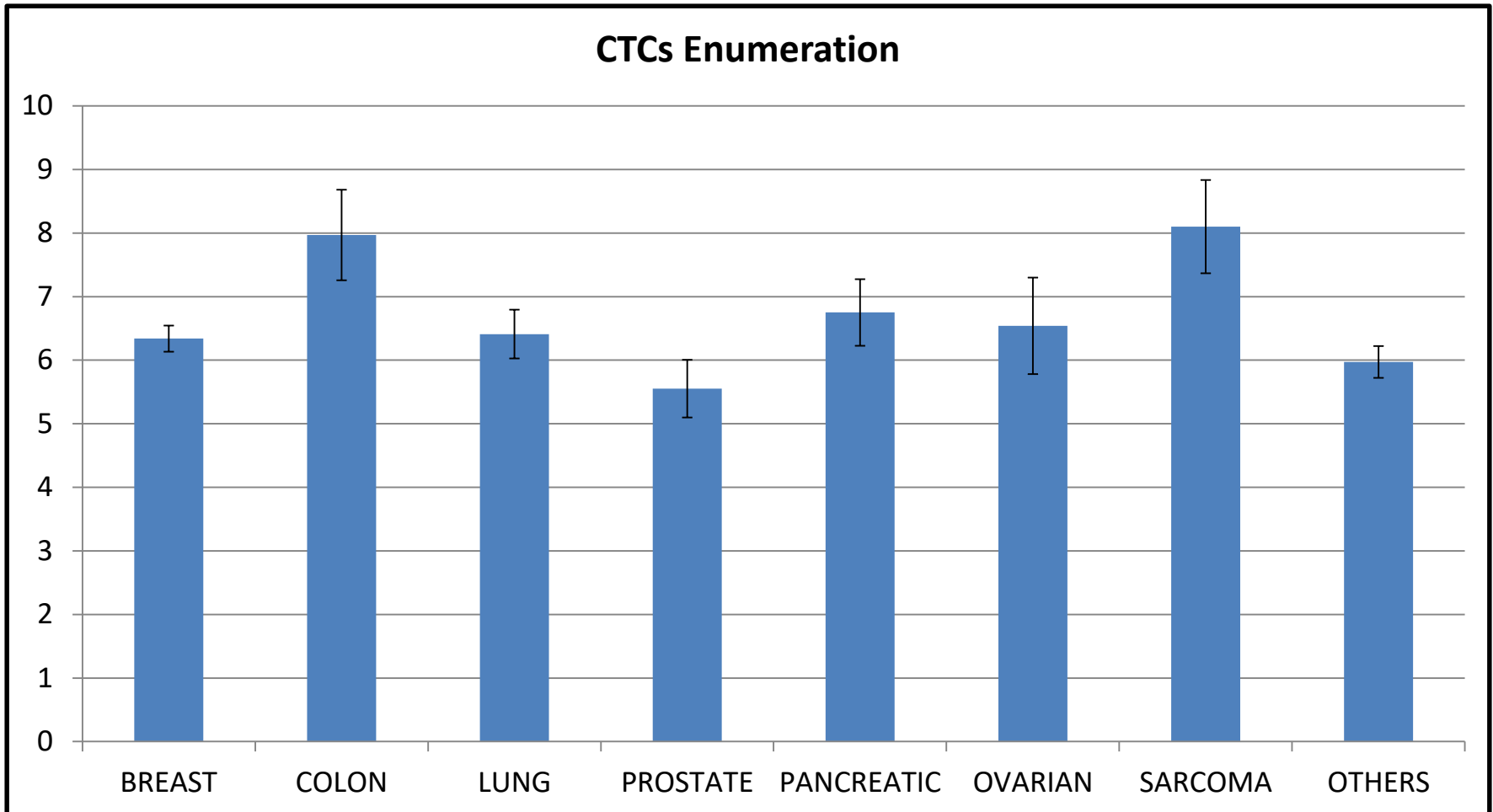
Results



Samples Tested

Results

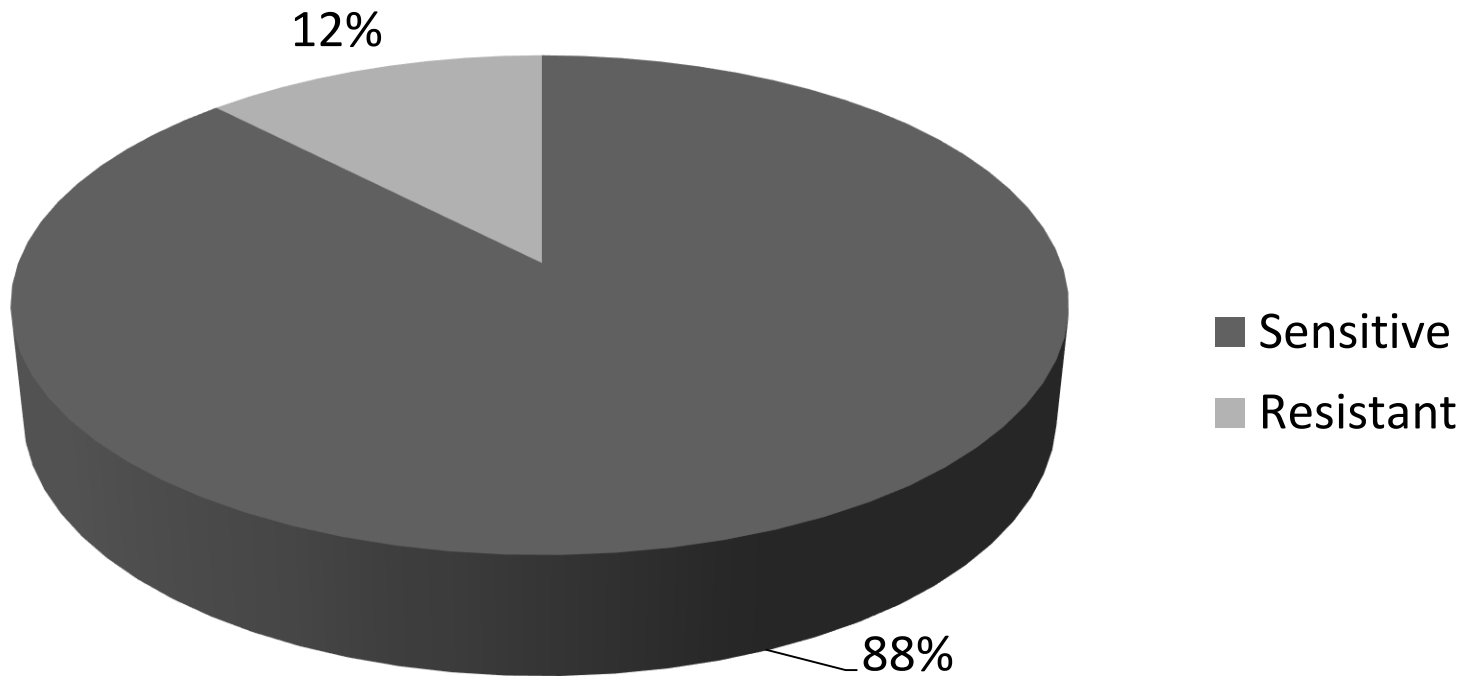
CTCs Enumeration



* Breast CTCs per 7.5ml- Other types per ml

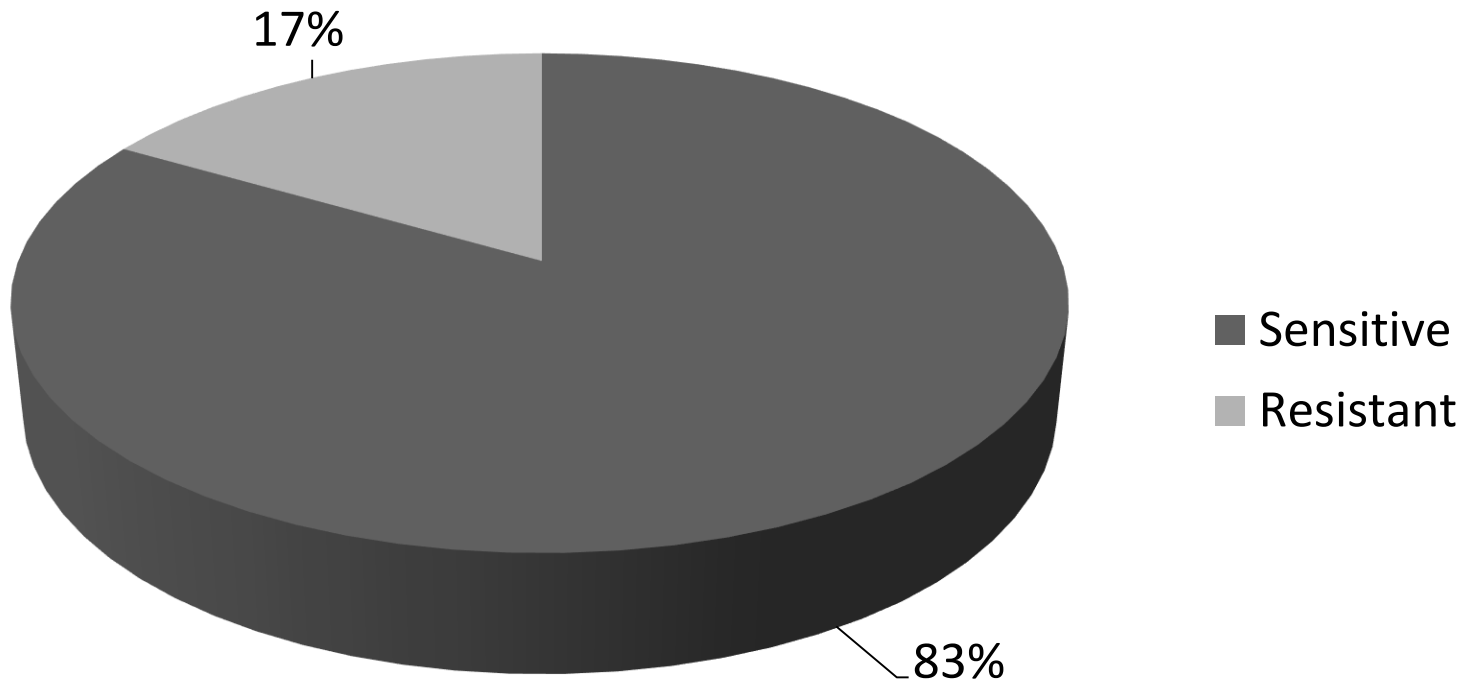
Results

Breast Cancer Sensitivity



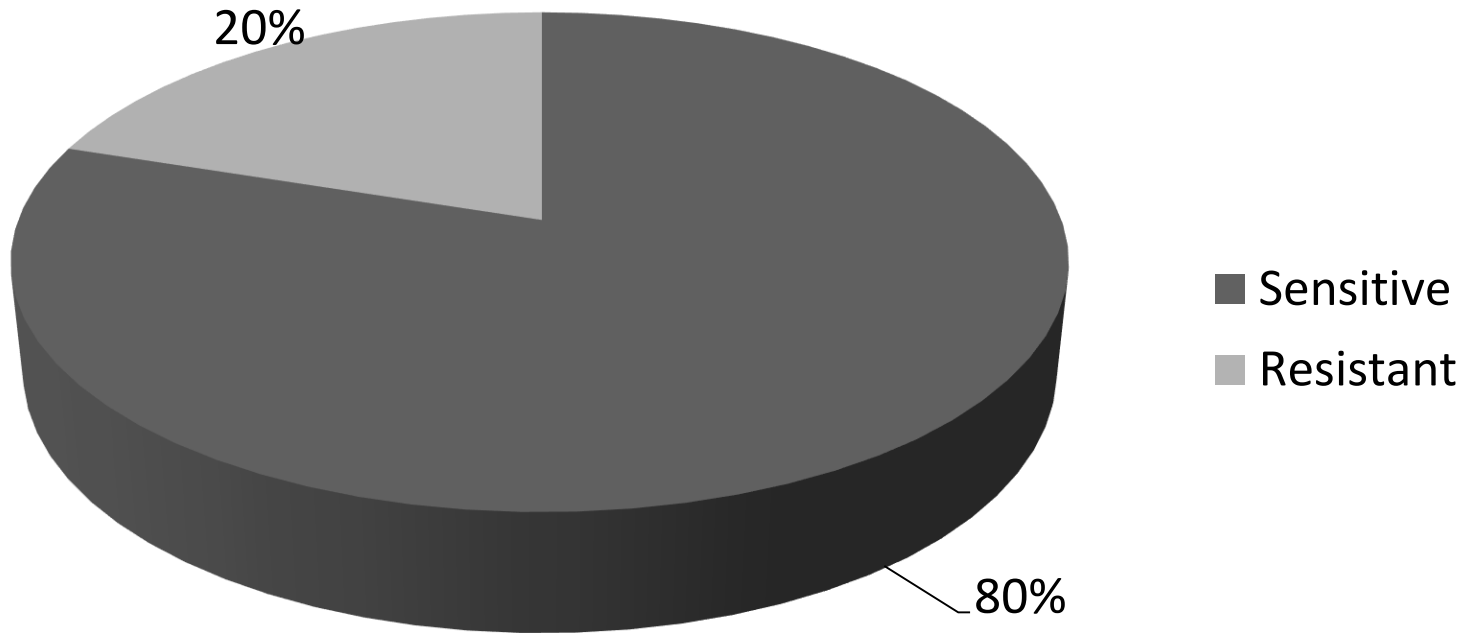
Results

Pancreatic Cancer



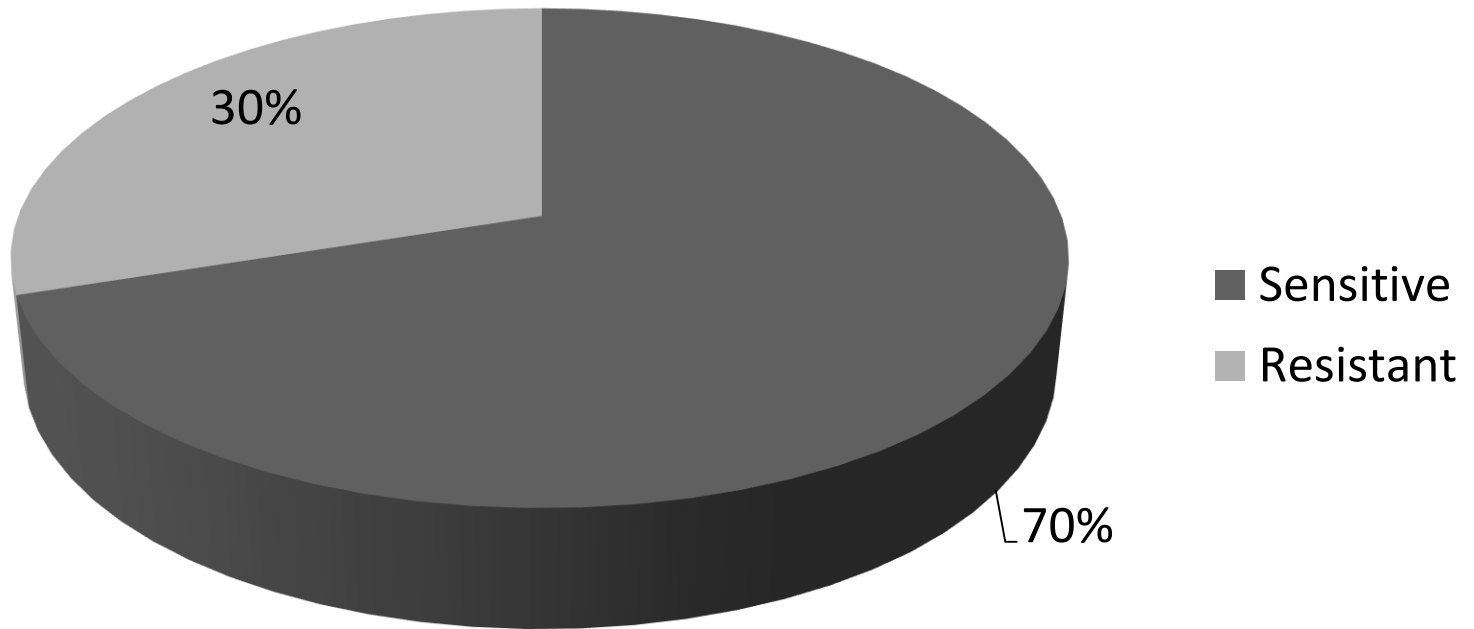
Results

Ovarian Cancer



Results

Colon Cancer



Concluding Remarks

- HSP correlated with resistance to hyperthermia
- Liquid biopsy based on CTCs study can be used for prediction response in different types of therapy
- CTCs study for thermo-tolerance

Selected Reference



- Lianos GD, Alexiou GA, et al. The role of heat shock proteins in cancer. *Cancer Lett.* 2015 May 1;360(2):114-8. doi: 10.1016/j.canlet.2015.02.026. Epub 2015 Feb 23.
- Skitzki JJ, Repasky EA, and Evans SS. Hyperthermia as an immunotherapy strategy for cancer. *Curr Opin Investig Drugs.* 2009 Jun;10(6):550-8.
- Horowitz M, Robinson SD. Heat shock proteins and the heat shock response during hyperthermia and its modulation by altered physiological conditions. *Prog Brain Res.* 2007;162:433-46.



**THANK YOU FOR YOUR TIME AND
PATIENCE**

**IN CASE OF QUESTIONS AND INQUIRIES
PLEASE CONTACT WITH**

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