

## Research Article

# The Level of Awareness Among ENT Clinicians About the Studies of Stem Cells in Turkey

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### Abstract

**Objectives:** Using stem cells in clinical practices began half a century ago by the hematopoietic stem cells transplantation. Recently stem cells are used instead of hearing aids usage and surgical interventions in the Ear Nose Throat (ENT) area. This study aimed to determine the approaches (knowledge) of ENT physicians in Turkey about the stem cells research.

**Methods:** We have made a questionnaire about stem cells research and the clinical use of stem cells therapies with 122 ENT clinicians who work in Turkey. Firstly, we checked the knowledge level on the stem cells research then measured the willingness to attend any educational courses on stem cells research according to ENT experience.

**Results:** Unapproved stem cells applications in clinical practices are described as risky by %88 of attendants. Still, most of the clinicians (64%) thinks regenerative stem cells technologies will be available to use in ENT clinics within the next decade. Indeed, they agree government should invest more (92%), support hospitals (86%) and scientists about stem cells because of stem cells therapies reduce recovery time of patients and hospital labors (78%). 65% of attendants have not advised their patients about stem cells storage banks yet. However, 83% of clinicians want to participate in a congress, a workshop about stem cells therapy to improve their knowledge level about it.

**Conclusion:** The professional organizations should encourage physicians to conduct training activities about stem cells therapy. Therefore, interdisciplinary meetings, education, and discussing the possible uses of stem cells technologies in clinical applications can stimulate interest amongst ENT clinicians.

**Keywords:** Awareness, ENT clinicians, stem cells

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Stem cells play important roles in homeostasis, and tissue repair helps to their self-renewal and differentiation capacity.<sup>[1, 2]</sup> Use of stem cells in clinical practice has begun half a century ago with the transplantation of hematopoietic stem cells to replace defective elements of the hematopoietic systems.<sup>[3]</sup> Then the derivation of hESC line from human blastocysts in 1998 by Thomson JA et al. have drawn attention to the potential use of stem cells in regenerative medicine.<sup>[4, 5]</sup> These developments encouraged researchers to employ this technique in other clinical areas such

as cardiology, orthopedics, dermatology, ophthalmology, gastroenterology, and aesthetical surgical applications.<sup>[3, 6]</sup>

Recently, stem cells therapy has also gained attention in the area of otolaryngology.<sup>[7]</sup> Otolaryngology is a surgical subspecialty which studies the conditions of the ear, nose, and throat (ENT) and related structures of the head and neck. Facial plastic and reconstructive surgery are also covered under this branch in addition to otology, neurotology, rhinology, pediatric otorhinolaryngology, and laryngology. The

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ear is one of the most intensively studied subjects of ENT. Hearing loss is one of the most prevalent ENT-related disorders in the world aside from the infections, acute injuries, tumor formations, or anatomic abnormalities. More than 300 million people worldwide are estimated to be affected.<sup>[7]</sup>

Hair cells lose their regenerative potential after development. Unfortunately, these cells are easily damaged by biological or physical factors, which may result in a permanent hearing loss.<sup>[8, 9]</sup> Hearing loss can affect both the physical and mental state of the individuals.<sup>[8]</sup> Recovery of auditory function is also important for improving the physiological and social state of the patients.<sup>[10]</sup> Hearing aids and cochlear implants can help to regain hearing function. Stem cells therapy promises to open new avenues in the treatment of the damaged cochlea without using any prosthesis. Recent findings suggest that molecular stem cells therapy has the potential for replacing surgical interventions or the use of hearing aids.<sup>[11]</sup>

It appears that this technology can even be exploited to treat ENT patients with respiratory duct problems. Both *in vitro* and *in vivo* studies suggest that structural remodeling of the respiratory duct can be achieved by the use of three-dimensional biologic scaffolds and recellularized with autologous stem cells.<sup>[12]</sup> More recent studies demonstrated that biologically compatible scaffolds with autologous stem cells were able to regenerate respiratory epithelium, cartilage, and maintain vascularization with graft potency *in vitro*.<sup>[13]</sup> Similarly, several clinical trials reported the use of mesenchymal stem cells (MSCs) for treating autoimmune diseases. Especially, MSCs seem to be attractive therapeutic tools for treating autoimmune diseases such as allergic rhinitis (AR) possibly through balancing the magnitude of the immune response.<sup>[14]</sup> Wingstrand VL et al.<sup>[15]</sup> showed that the potential regenerative capacity of therapy with mesenchymal stem cells could be applied to scarred vocal folds.

However, application of this technology in ENT-related clinical practices is not very common, and survey research data indicates that a bulk of the ENT clinicians have limited knowledge on specific aspects of stem cells technology and its' use in clinical applications in the UK<sup>[16]</sup> In this study, we have employed a survey with 122 ENT clinicians in Turkey for understanding of certain aspects of stem cells research and the clinical use of stem cells therapies according to the experience of ENT specialist.

## Methods

To investigate the level of awareness of ENT clinicians and to be able to evaluate their attitude towards the use of stem cells technologies in clinical applications, a questionnaire has been developed. Permission from "The Scientific Committee for The Society of Ear Nose Head Throat Sur-

gery" in Turkey was acquired for conducting the survey. The questionnaire was sent to all ENT doctors via e-mail who are registered in The Society of Ear Nose Head Throat Surgery. An online link for the questionnaire had been shared in the e-mail message. A total of 122 ENT specialist individuals answered the questionnaire which was available on the official web site of the ENT Society for three months. The mandatory part of the questionnaire included closed questions (Yes/No/Maybe/don't know), and the respondents were asked to give a single answer. If the answer to our survey questions is "yes" or "can," it was YES accepted. If the answer to our survey questions is "no" and "not know," it was No accepted. The statistical significance between the groups was tested via Chi-square test.

## Results

We have first checked the effect of professional experience on the level of awareness on stem cells research (Table 1).

To determine whether professional experience improved the awareness of the stem cells research, we grouped the respondents into two groups according to their experience. Out of 122 total respondents, 34 of them (27.9%) had at least ten years of experience, while 88 physicians (72.1%) had less than ten years of experience. Both groups were given answers to the 10 question related to stem cells research (Table 1). However, no statistically significant difference was detected between the contrasted groups of respondents when their all answers were analyzed according to their professional experience (Table 1). This observation suggests that professional experience is not an important factor in determining the attitude of ENT clinicians towards stem cells research.

We have checked their willingness to attend any educational courses or workshops about stem cells research (Table 2).

Our results demonstrated that 83.6% of the respondents (103 out of 122 respondents) are willing to attend educational courses about stem cells technologies. Intriguingly, statistically, significant differences were detected between the groups (Table 2). For example, analysis of the answers to the question "Do you think that unapproved stem cells treatment protocols can result in serious health issues as well as personal and financial problems?" revealed a significant difference of opinion over the possible risks of unapproved stem cells applications in clinical practices. ENT clinicians who were willing to attend educational activities seemed to have a better understanding of the possible medical complications that might arise due to use of unapproved stem cells applications in clinics.

Moreover, significant differences of opinion were also detected between the two groups when the answers to the following questions were analyzed: "Do you agree that

**Table 1.** Comparison of responses according to the professional experience of ENT specialist

No	Survey Question	Total		1-10 years of experience		Over 10 years of experience		p
		Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
1	Can different diseases or syndromes be treated with a single type of stem cell?	75	25	66 (54.1)	22 (18.0)	22 (18.0)	12 (9.8)	0.180
2	Are the autologous stem cells suitable for self-treatment of all patients?	75	25	66 (54.1)	22 (18.0)	23 (18.9)	11 (9.0)	0.274
3	Do you think that unapproved stem cells treatment protocols can result in serious health issues as well as personal and financial problems?	88.5	11.5	76 (62.3)	12 (9.8)	32 (26.2)	2 (1.6)	0.190
4	If you have not participated yet would you like to attend any workshop/conference/ongoing training program that is relevant to stem cells applications?	83.6	15.6	73 (59)	15 (12.3)	30 (24.6)	4 (3.3)	0.338
5	Do you agree that the regenerative stem cells technologies will be available to use in ENT clinics within the next decade?	64	36	54 (44.3)	34 (27.9)	24 (19.7)	10 (8.2)	0.231
6	Do you agree that stem cells treatment will shorten the recovery time of patients and therefore it will contribute to the economy by preventing loss of labor?	78.7	21.3	69 (56.6)	19 (15.6)	27 (22.1)	7 (5.7)	0.558
7	Do you advise your patients to consider using stem cells banks and provide information about its' future use?	34.5	65.6	34 (27.9)	54 (44.3)	8 (6.6)	26 (21.3)	0.085
8	Do you think that we need a government-supported stem cells hospital?	86.1	13.9	77 (63.1)	11 (9.0)	28 (23.0)	6 (4)	0.320
9	Do you think that biotechnology and pharmaceutical companies should make more investments to develop stem cells technologies?	89.3	10.6	76 (62.3)	12 (9.8)	33 (27.0)	1 (0.8)	0.075
10	Do you agree that the government should make more investments and give incentives for developing stem cells therapies?	92	7.3	80 (65.6)	8 (6.6)	33 (27.0)	1 (0.8)	0.226

stem cells treatment will shorten the recovery time of patients and therefore it will contribute to the economy by preventing loss of labor?" and "Do you think that biotechnology and pharmaceutical companies should make more investments to develop stem cells technologies?" (Table 2). As shown in Table 2, those who were willing to attend educational activities exhibited a more optimistic approach towards the possible future contributions of stem cells

technologies to the social and economic areas as well as the clinical practices. This group also supported the idea that more investments should be made to develop stem cells technologies (Table 2), suggesting that ENT clinicians who were willing to attend educational activities were more open to innovative approaches when compared to the other group. On the other hand, no statistically significant differences of opinion were determined between the

**Table 2.** Physicians categorized according to their willingness to attend courses on stem cells technologies

Question	Willing to courses		Not willing to courses		p
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
Can different diseases or syndromes be treated with a single type of stem cell?	75 (61.5)	28 (23.0)	13 (10.7)	6 (4.9)	0.443
Are the autologous stem cells suitable for self-treatment of all patients?	75 (61.5)	28 (23.0)	14 (11.5)	5 (4.1)	0.591
Do you think that unapproved stem cells treatment protocols can result in serious health issues as well as personal and financial problems?	95 (77.9)	8 (6.6)	13 (10.7)	6 (4.9)	0.009**
Do you agree that the regenerative stem cells technologies will be available for use in ENT clinics within the next decade?	68 (55.7)	35 (28.7)	10 (8.2)	9 (7.4)	0.195
Do you agree that stem cells treatment will shorten the recovery time of patients, and therefore, it will contribute to the economy by preventing loss of labor?	85 (69.7)	18 (14.8)	11 (9.0)	8 (6.6)	0.022*
Do you advise your patients to consider using stem cells banks and provide information about its' future use?	34 (27.9)	69 (56.6)	8 (6.6)	11 (9.0)	0.303
Do you think that we need a government-supported stem cells hospital?	89 (73.0)	14 (11.5)	16 (13.1)	3 (2.5)	0.517
Do you think that biotechnology and pharmaceutical companies should make more investments to develop stem cells technologies?	95 (77.9)	8 (6.6)	14 (11.5)	5 (4.1)	0.031*
Do you agree that the government should make more investments and give incentives for developing stem cells therapies?	97 (79.5)	6 (4.9)	16 (13.1)	3 (2.5)	0.146

two groups (those who were willing to attend courses and those did not consider attending to educational courses) for the rest of the questions in the questionnaire (Table 2).

## Discussion

### The Level of Awareness on the Stem Cells Research

Despite the technical, ethical, and legal limitations, significant developments have been achieved in the area of stem cells research.<sup>[17]</sup> Stem cells therapy appears to be a promising candidate for the treatment of damaged cochlea without the use of any prosthesis. Findings suggest that molecular stem cells therapy can be a replacement for surgical interventions or the use of hearing aids in the future.<sup>[11]</sup> The potential regenerative capacity of therapy with mesenchymal stem cells can also be used for regeneration of respiratory epithelium.<sup>[13, 14]</sup> Although the professional experience of the physicians in the Turkish ENT community is less or more than ten years, there is no effect of the professional seniority on stem cells approaches ( $p>0.05$ ). Reanalysis of data obtained from our survey study previously conducted in Turkey<sup>[18]</sup> yielded exciting results. For example, ENT clini-

cians who were willing to attend to educational activities seemed to have a better understanding of the possible medical complications that might arise due to use of unapproved stem cells applications in clinics ( $p<0.05$ ). Physicians who are willing to participate in training courses are more aware of stem cells therapies. It was observed that this stem cells treatment would shorten the recovery time of the patients and thus contribute to the economy by preventing the loss of labor ( $p<0.05$ ). It has been seen that biotechnology and pharmaceutical companies need to invest more to develop stem cells technologies ( $p<0.05$ ). Moreover, those who were willing to attend to educational activities exhibited a more positive approach towards the possible future contributions of stem cells technologies to the social and economic areas as well as the clinical practices. This group of respondents also seemed to be more open to innovative approaches.

Comparison of survey data from the UK and Turkey First, we sought to compare some of the major findings from previously published data by Kepekci et al. (2018) and Ali KH et al. (2012).

In our study, when we asked the participating ENT clinicians

to know about stem cells therapies as a potential treatment for hearing loss, we answered 94.3% yes, 5.7% no. In the UK, when asked about participating ENT clinicians with information about stem cells therapy as a potential treatment for hearing loss, 57% knew very little, and 30% had no information at all. It found higher levels of awareness within the ENT community in Turkey. In the UK, the question of whether the government should invest more to support and encourage biotechnology companies in stem cells therapies, 92.6% "yes," 7.4% "no" answer was taken, 55% of the participant replied that stem cells therapies should be supported by the government. A majority of the ENT clinicians (65% of the participants from Turkey, 60% of the respondents from the UK) agreed that the governments should make more investments in the area of stem cells therapies, although a minority of the participants seemed to show interest in stem cells research.<sup>[16, 18]</sup> Interestingly, 87.7% of Turkish participants anticipated that stem cells therapies would be able to provide successful solutions for the treatment of ENT-related chronic diseases, while clinicians in the UK appeared to be more cautious on this subject (only 30% of the participants shared this view).<sup>[16]</sup> 58.1% of the Turkish ENT clinicians were concerned regarding the possibility that stem cells technologies might replace their surgical skills in the future.<sup>[18]</sup> On the other hand, the majority of the respondents in the UK (80%) did not consider stem cells technologies as a risk which would be able to replace the surgical skills.<sup>[16]</sup> In Turkey, causes of the high awareness of stem cells research may result from training in ENT society, and according to the UK (2012), it can be attributed to the more recent publication in Turkey (2018). However, it can be said that the stem cells are more popular in ENT society over the years. Regardless of their professional experience, ENT physicians should be encouraged to train activities in terms of stem cells therapy approaches. We speculate that interdisciplinary meetings discussing the possible uses of stem cells technologies in clinical applications can stimulate interest amongst ENT clinicians. The national and international support for stem cells studies will be the most important factor in triggering interest in stem cells research among the ENT clinicians.

### Disclosures

**Ethics Committee Approval:** The study was approved by the ethics committee of Istanbul Yeni Yuzyil University (6/5/2017-2017/4).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

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