

Active versus Passive

- Active: “Subject-verb-object” or “Subject-verb”
- Passive: “Object-verb-subject” or “Object-Verb” “Mistakes were made”
 - Classic: Passive verb = a form of the verb “to be” + the past participle of the main verb. The main verb must be a transitive verb (that is, take an object).
 - Is, Are, Was, Were, Be, Been, Am.
 - Could be, shall be, should be, will be, would be, may be, might be, must be, has been.
- My first visit to Boston will always be remembered by me.
- Cigarette ads were designed to appeal especially to children.

Kristin Sainani, Stanford University.

To turn the passive voice back to the active voice: Ask who does what to whom?

- PASSIVE: By applying a solution of fluorescently labeled alpha-bungarotoxin to the hindlimb muscles, the distribution of acetylcholine receptors could be observed.
- **ACTIVE: We could observe the distribution of acetylcholine receptors by applying a solution of fluorescently labeled alpha-bungarotoxin to the hindlimb.**
- PASSIVE: General dysfunction of the musculo-skeletal system following nerve gas exposure has been suggested by both animal and human studies.
- **ACTIVE: Animal and human studies suggest that nerve gas exposure causes general musculo-skeletal dysfunction.**
- PASSIVE: Increased promoter occupancy and transcriptional activation of p21 and other target genes were observed in muscular dystrophy patients.
- **ACTIVE: We observed increased promoter occupancy and transcriptional activation of p21 and other target genes in muscular dystrophy patients. (OR: Muscular Dystrophy patients have increased promoter occupancy and transcriptional activation of p21 and other target genes.)**
- PASSIVE: The activation of Ca⁺⁺ channels is induced by the depletion of sarcoplasmic reticulum Ca⁺⁺ stores.
- **ACTIVE: Depleting sarcoplasmic reticulum Ca⁺⁺ stores activates Ca⁺⁺ channels.**
- PASSIVE: Additionally, it was found that overexpression of wnt increased the number of neuromuscular junctions, while overexpression of insulin did not.
- **ACTIVE: Overexpression of wnt increased the number of neuromuscular junctions, while overexpression of insulin did not.**

Yes! You can use “we” or “I”

1. Why: because it’s better:
 - Passive is pathetic
 - It is a myth that avoiding first-person pronouns lends objectivity to the paper. **Be honest! You ran the experiments, to pretend otherwise is ridiculous.**
 - Take responsibility.
2. Why: because journals say so:
 - From Science magazine: “Use active voice when suitable, particularly when necessary for correct syntax (e.g. To address this possibility, we constructed a λZap library ...”).
3. Great papers:
 - Watson and Crick’s 1953 paper in Nature begins, “We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.).”
<http://www.exploratorium.edu/origins/coldspring/printit.html>

Methods section: Passive voice is OK.

Active voice practice

- A recommendation was made by the DSMB committee that the study be halted.
- **The DSMB committee recommended that the study be halted.**
- Major differences in the reaction times of the two study subjects were found.
- **We observed major differences in the reaction times of the two study subjects.**
- It was concluded by the editors that the data had been falsified by the authors.
- **The editors concluded that the authors falsified their data.**
- The first visible-light snapshot of a planet circling another star has been taken by NASA’s Hubble Space Telescope.
- **NASA’s Hubble Space Telescope has taken the first visible-light snapshot of a planet circling another star.**
- Therefore, the hypothesis that the overall kinetics of a double transtibial amputee athlete and an able-bodied sprinter at the same level of performance are not different was rejected.
- **Therefore, we rejected the hypothesis that a double transtibial amputee can sprint at the same speed as an able-bodied sprinter.**

Kristin Sainani, Stanford University.

- Among major regulators of limb patterning is Sonic Hedgehog (Shh), which is expressed in the zone of polarizing activity (ZPA) at the posterior margin of the limb bud and signals to adjacent cells to pattern the antero-posterior lateral plate-derived limb mesenchyme, including the cartilage and tendon elements (Riddle et al. 1993).
- **Shh from the posterior margin of the limb bud specifies the antero-posterior pattern of cartilage and tendon in the limb (Riddle et al. 1993).**
- Previous studies investigating the role of Shh and Ihh in limb myogenesis have reported that limb MPCs are driven to proliferate (Duprez et al. 1998) or survive (Kruger et al. 2001; Bren- Mattison et al. 2011), change the balance between proliferation and differentiation (Amthor et al. 1998; Bren-Mattison and Olwin 2002), or undergo a slow specific myogenic program (Li et al. 2004) by Hedgehog signals.
- **Hedgehog signaling can affect the balance of proliferation and differentiation, enhance survival, or promote slow-specific myogenesis (Duprez, et al., 1998; Amthor, et al. 1998; Bren-Mattison and Olwin 2002; Li et al., 2004; Kruger et al. 2001; Bren- Mattison et al. 2011).**

Devoto

anderson_borycki2012.pdf

Fix the clunky nouns, turn them into spunky verbs!

- | | |
|------------------------------------|------------------------|
| • Obtain estimates of | estimate |
| • Has seen an expansion in | has expanded |
| • Provides a methodologic emphasis | emphasizes methodology |
| • Take an assessment of | assess |
| • Provide a review of | review |
| • Offer confirmation of | confirm |
| • Make a decision | decide |
| • Shows a peak | peaks |
| • Provide a description of | describe |

Kristin Sainani, Stanford University.

Use strong verbs. Pick the right one!

- Loud music came from speakers embedded in the walls, and the entire arena moved as the hungry crowd got to its feet.
- Loud music **exploded** from speakers embedded in the walls, and the entire arena **shook** as the hungry crowd **leaped** to its feet. (Bringing down the house, Ben Mezrich).
- The WHO reports that approximately two-thirds of the world's diabetics are found in developing countries and estimates that the number of diabetics in those countries double in the next 25 years.
- The WHO **estimates** that two-thirds of the world's diabetics are found in developing countries and **projects** that the number of diabetics in those countries double in the next 25 years.

Kristin Sainani, Stanford University.

Don't bury the main verb (the case of the buried predicate)

- One study of 930 adults with multiple sclerosis (MS) receiving care in one of two managed care settings or in a fee-for-service setting found that only two-thirds of those needing to contact a neurologist for an MS-related problem in the prior 6 months had done so (Vickrey et al., 1999).

Kristin Sainani, Stanford University.

Cut unnecessary words.

- This paper provides a review of the basic tenets of cancer biology study design, using as examples studies that illustrate the methodologic challenges or that demonstrate successful solutions to the difficulties inherent in biological research.
 - This paper reviews cancer biology study design, using examples that illustrates specific challenges and solutions.
- As it is well known, increased athletic activity has been related to a profile of lower cardiovascular risk, lower blood pressure levels, and improved muscular and cardio-respiratory performance.
 - Increased athletic activity is associated with lower cardiovascular risk, lower blood pressure, and improved fitness.
 - Increased athletic activity lowers cardiovascular risk and blood pressure, and improves fitness. (stronger level of evidence)
- The experimental demonstration is the first of its kind and is a proof of principle for the concept of laser driven particle acceleration in a structure loaded vacuum.
 - The experiment provides the first proof of principle of laser driven particle acceleration in a structure loaded vacuum.
- Brain injury incidence shows two peak periods in almost all reports: rates are the highest in young people and the elderly.
 - Brain injury incidence peaks in the young and the elderly.

Kristin Sainani, Stanford University.

Common Clutter

- Long words that could be shorter
 - A majority of most
 - A number of Many
 - Are of the same opinion agree
 - Less frequently occurring rare
 - All three of the the three
 - Give rise to cause
 - Due to the fact that because
 - Have an effect on affect
 - Based on the assumption that if
- Repetitive words or phrases
 - Studies/examples
 - Illustrate/demonstrate
 - Challenges/difficulties
 - Successful solutions
- Adverbs
 - Very really quite basically generally
- Dead Weight words and phrases
 - As it is well known
 - As it has been shown
 - It can be regarded that
 - It should be emphasized that
- Empty words and phrases
 - Basic tenets of
 - Methodologic
 - Important
- Unnecessary jargon and acronyms
- Adverbs
 - Very really quite basically generally

Kristin Sainani, Stanford University.

“I have only made this letter rather long because I have not had time to make it shorter.” Blaise Pascal, Lettres provinciales, 16, Dec. 14, 1656.

Eliminate the negative

- **Not honest**
- **Not harmful**
- **Not important**
- **Does not have**
- **Did not remember**
- **Did not pay attention to**
- **Did not succeed**



Eliminate there are/there is

- **There are many ways in which we can arrange the pulleys**
 - We can arrange the pulleys in many ways.
- **There was a long line of bacteria on the plate**
 - Bacteria lined the plate.
- **There are many neuroscientists who like to write**
 - Many neuroscientists like to write
- **The data confirm that there is an association between vegetables and cancer.**
 - The data confirm an association between vegetables and cancer.

Kristin Sainani, Stanford University.

Cut the clutter work in class

- Anti-inflammatory drugs may be protective for the occurrence of Alzheimer’s Disease.
 - .
- Clinical seizures have been estimated to occur in 0.5% to 2.3% of the neonatal population.
 - .
- Ultimately p53 guards not only against malignant transformation but also plays a role in developmental processes as diverse as aging, differentiation, and fertility.
 -)
 -)
- Injuries to the brain and spinal cord have long been known to be among the most devastating and expensive of all injuries to treat medically.
 - .
- An IQ test measures an individual’s abilities to perform functions that usually fall in the domains of verbal communication, reasoning, and performance on tasks that represent motor and spatial capabilities.
 - o
 - ani
- As we can see from Figure 2, if the return kinetic energy is less than $3.2 U_p$, there will be two electron trajectories associated with this kinetic energy.
 -). Devoto
 - Sainani.

Kristin Sainani, Stanford University.

Cut the clutter work in class

- Anti-inflammatory drugs may be protective for the occurrence of Alzheimer's Disease.
 - Anti-inflammatory drugs may protect against Alzheimer's Disease.
- Clinical seizures have been estimated to occur in 0.5% to 2.3% of the neonatal population.
 - Clinical seizures occur in 0.5% to 2.3% of newborns.
- Ultimately p53 guards not only against malignant transformation but also plays a role in developmental processes as diverse as aging, differentiation, and fertility.
 - Ultimately p53 guards against malignant transformation and plays a role in processes such as aging, differentiation, and fertility. (devoto)
 - Besides preventing cancer, p53 also plays roles in aging, differentiation, and fertility (Sainani)
- Injuries to the brain and spinal cord have long been known to be among the most devastating and expensive of all injuries to treat medically.
 - Brain and spinal cord injuries are among the most devastating and expensive.
- An IQ test measures an individual's abilities to perform functions that usually fall in the domains of verbal communication, reasoning, and performance on tasks that represent motor and spatial capabilities.
 - An IQ test measures verbal communication, reasoning, and performance on motor and spatial tasks. Devoto
 - An IQ test measures an individual's verbal, reasoning, or motor and spatial abilities. Sainani
- As we can see from Figure 2, if the return kinetic energy is less than $3.2 U_p$, there will be two electron trajectories associated with this kinetic energy.
 - If the return kinetic energy is less than $3.2 U_p$, it will be associated with two electron trajectories (Fig. 2). Devoto
 - Figure 2 shows that a return kinetic energy less than $3.2 U_p$ yields two electron trajectories. Sainani.

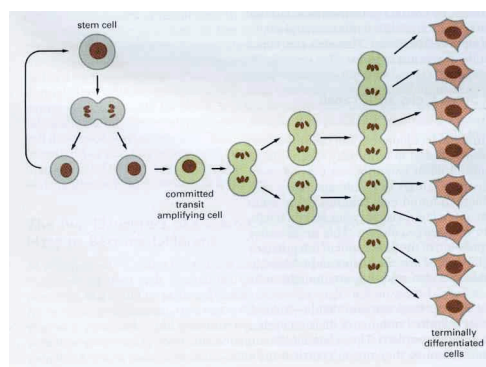
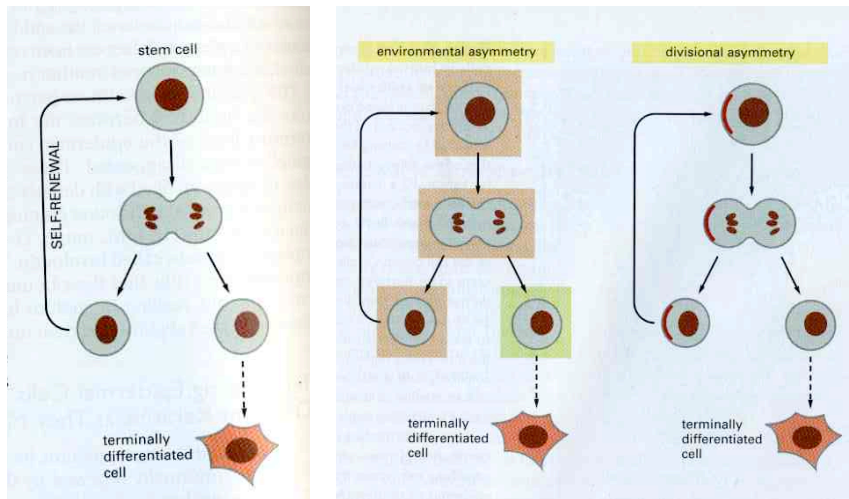
Kristin Sainani, Stanford University.

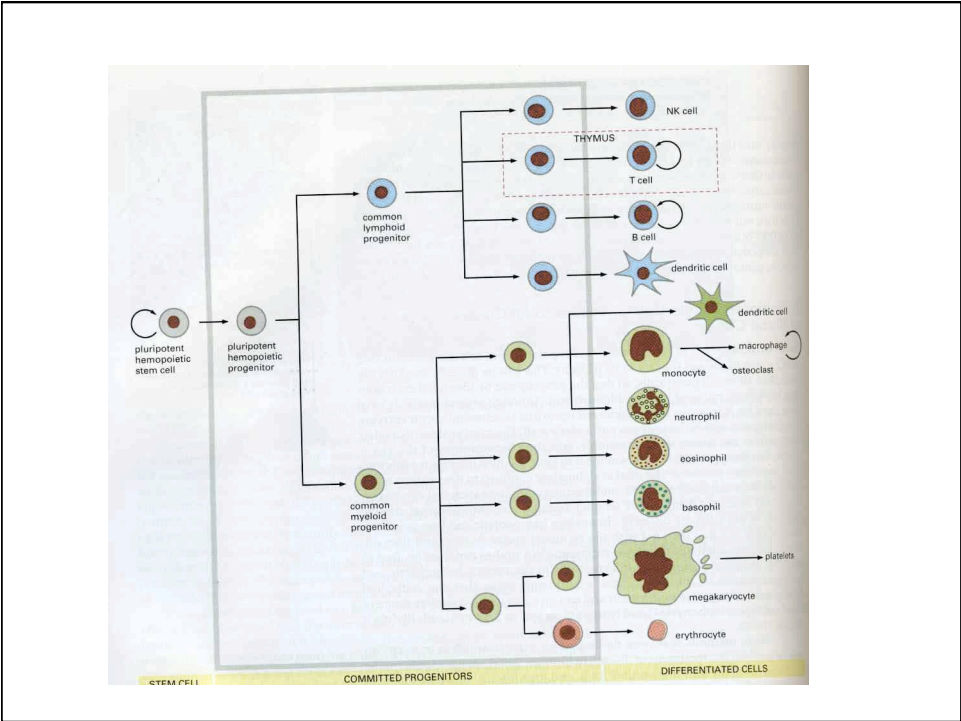
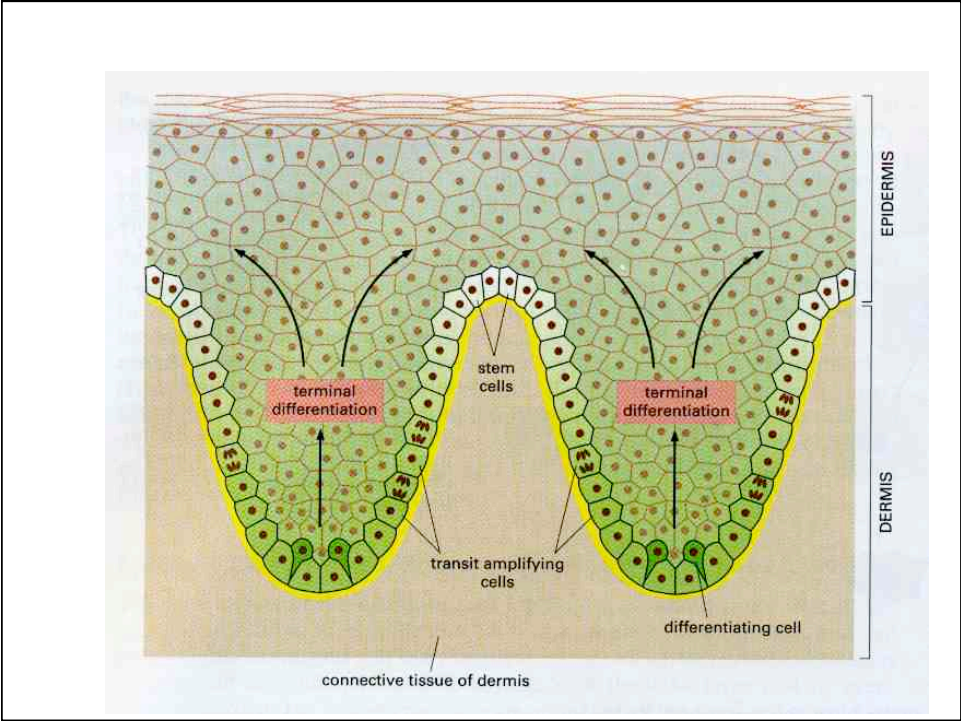
Omit needless prepositions

- The meeting happened on Monday.
 - The meeting happened Monday.
- They agreed that it was true.
 - They agreed it was true.

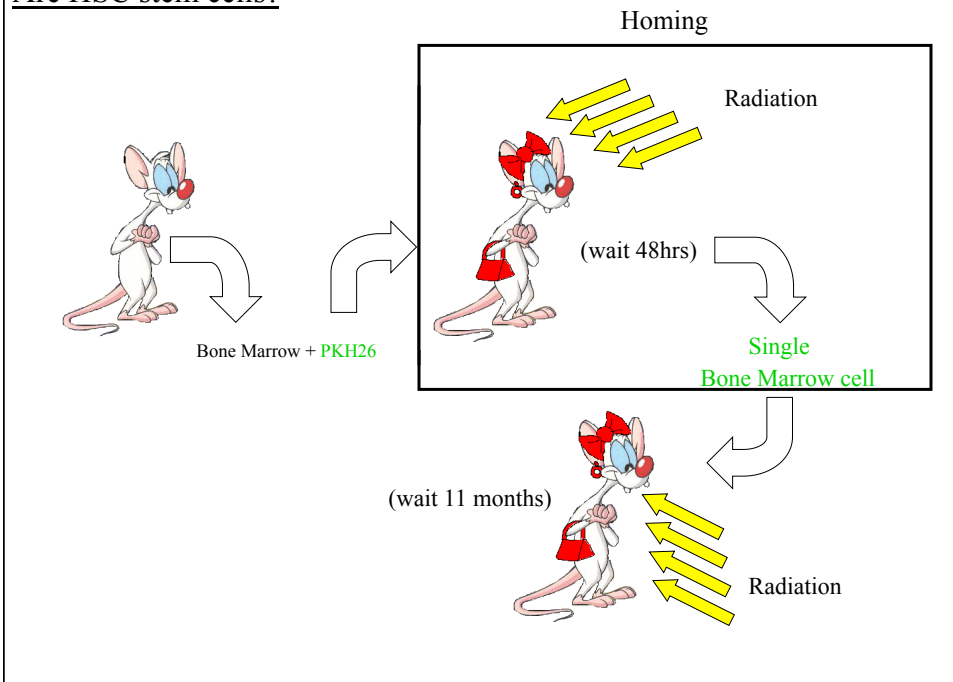
Assignment (go to web)

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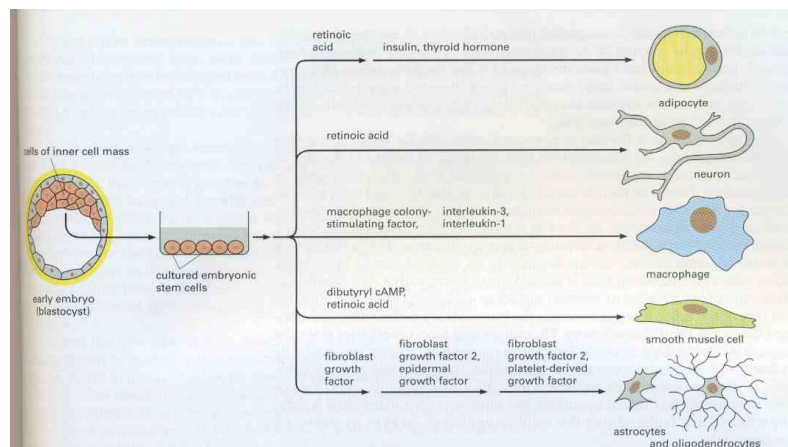


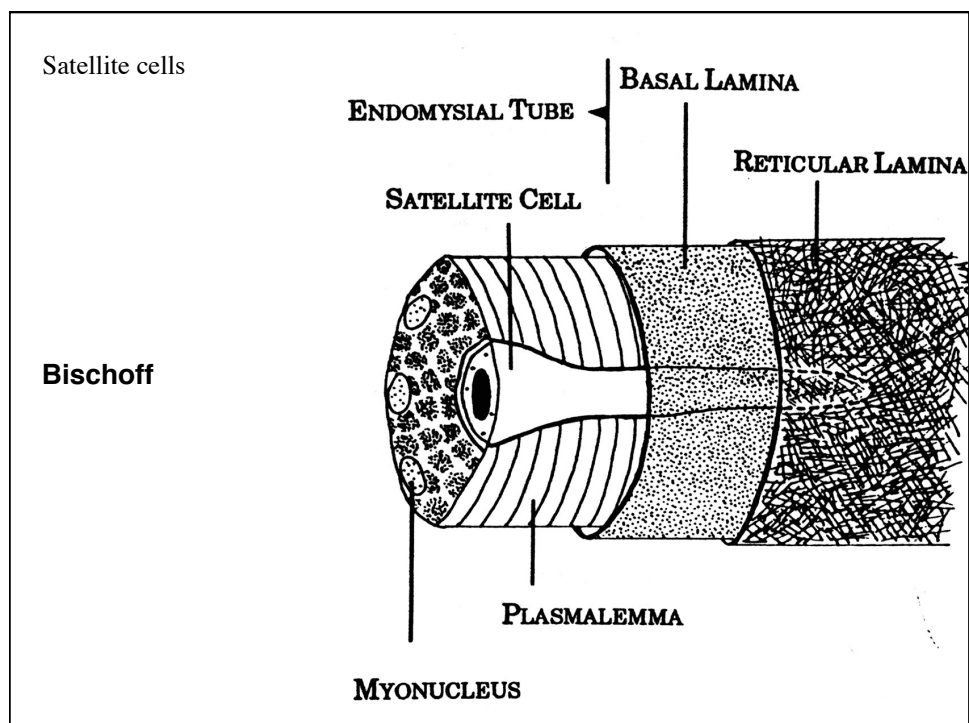
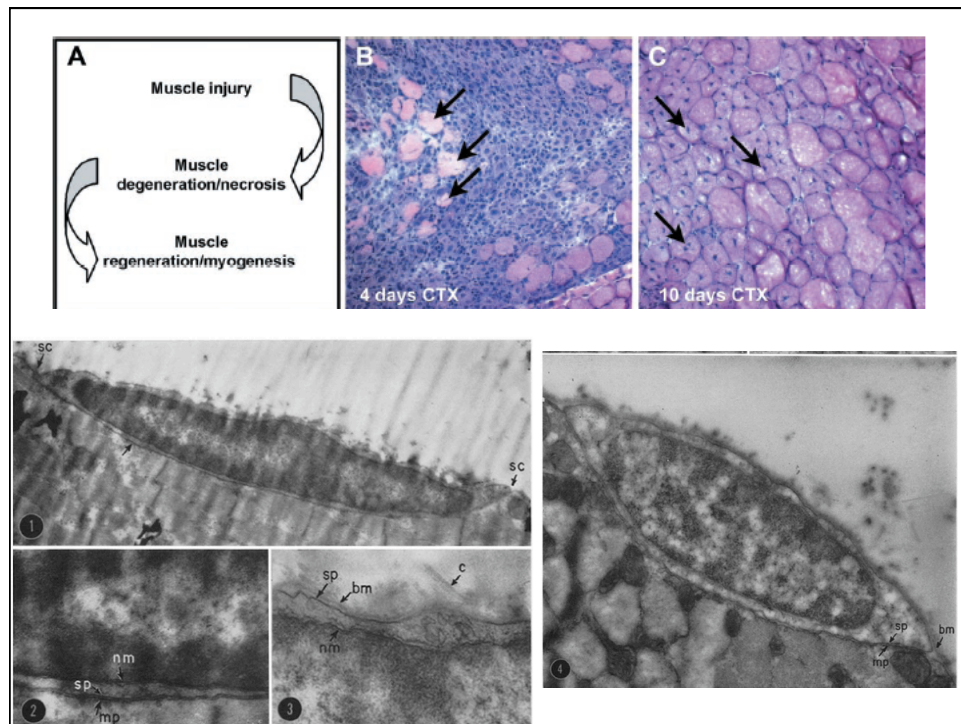


Are HSC stem cells?



Embryonic Stem Cells





Advantages and disadvantages of satellite cells for cell-based therapies

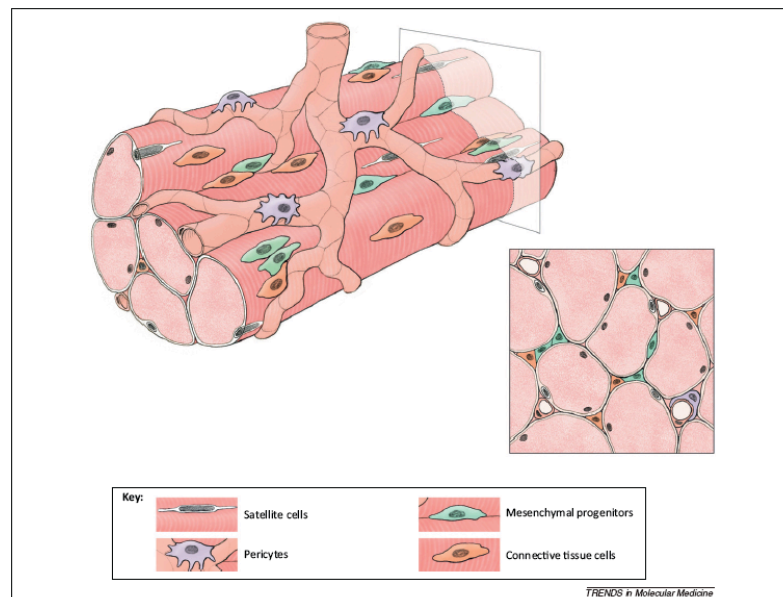
Advantages

- Can be identified reliably
- Accessibility and abundance
- Can be isolated prospectively
- Self-renewal and efficient myogenic differentiation
- Differentiation program is understood
- Experimental and animal models are available to study satellite cells under physiological and pathological conditions
- Practiced in clinical trials

Disadvantages

- Not suitable for systemic delivery
- Immune rejection
- Poor migration
- Poor survival after transplantation
- Reduced myogenic potential after culture

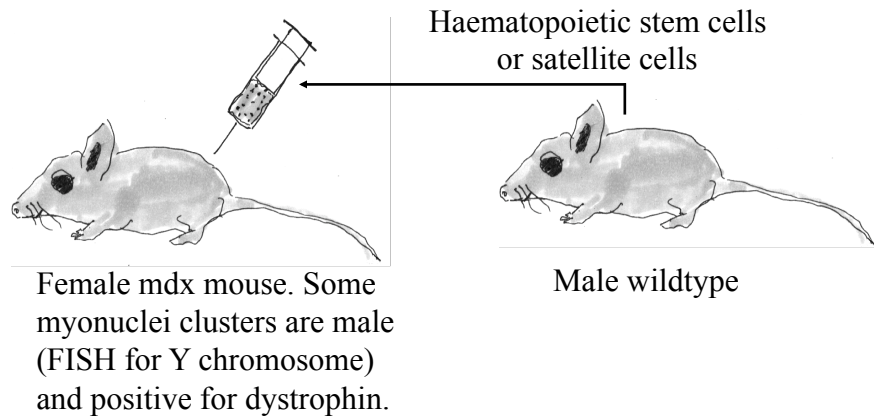
Other populations



Pannérec, et al., 2012

Another source of stem cells?

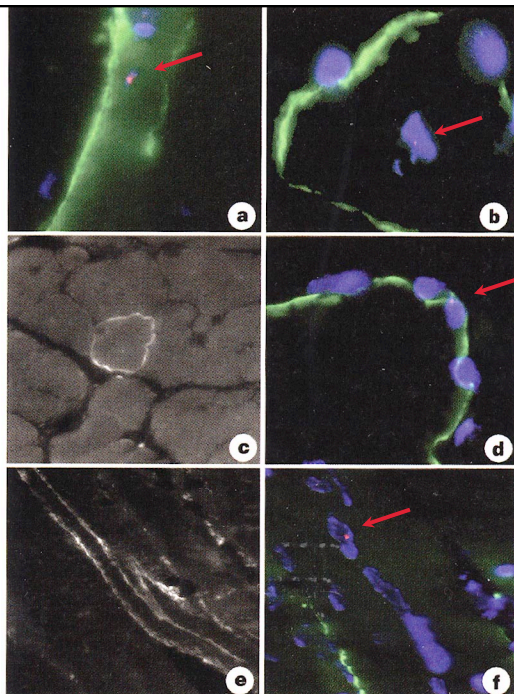
Blood stem cells nuclei can enter muscle:

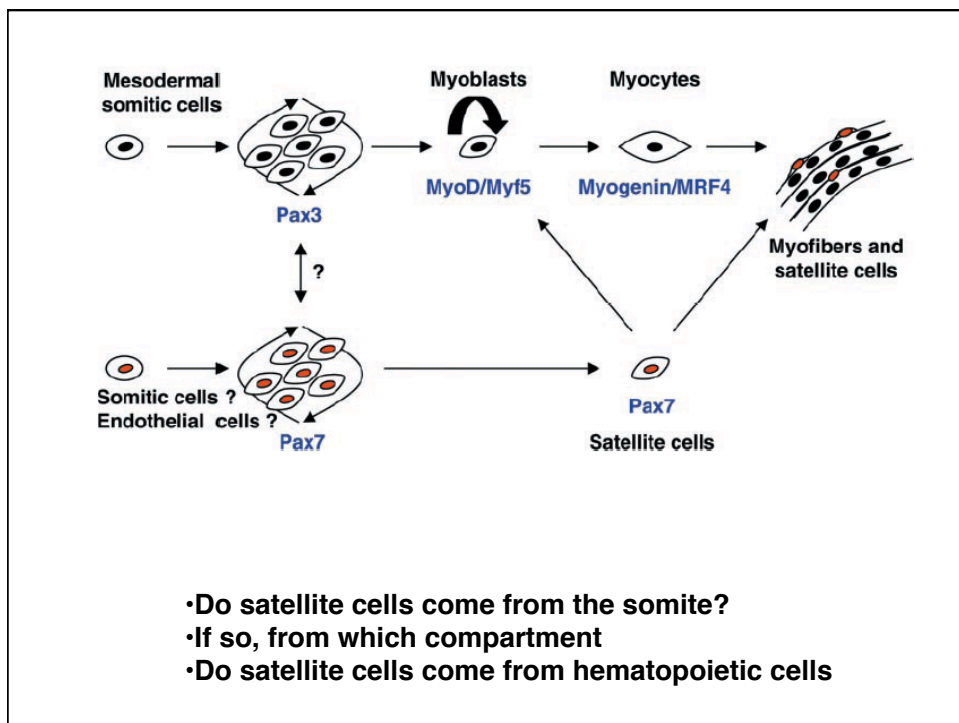
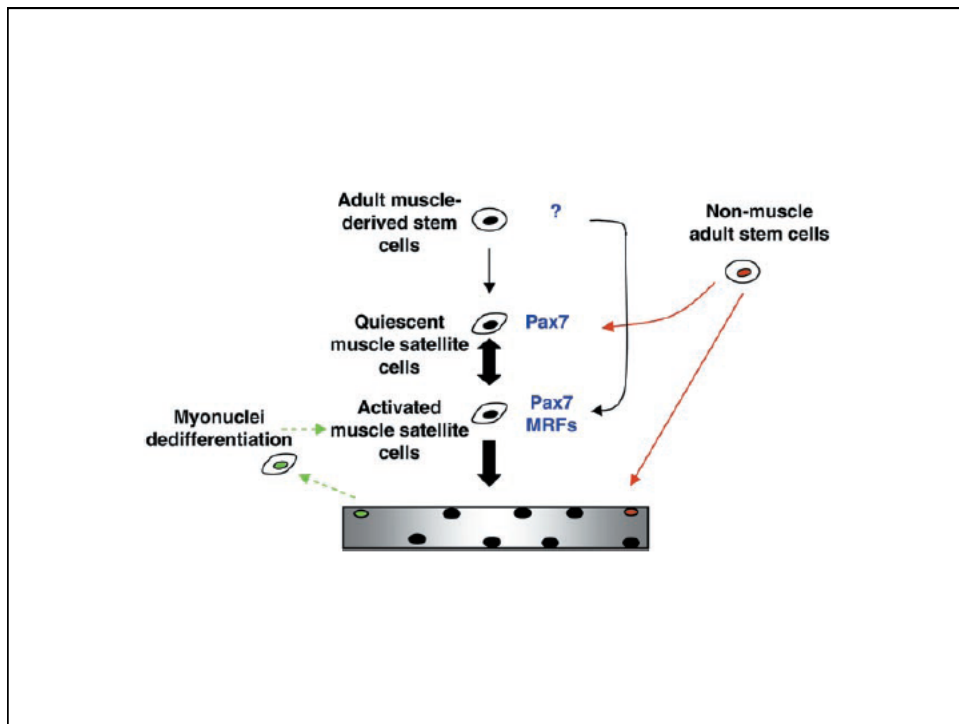


Gussoni et al. (1999)

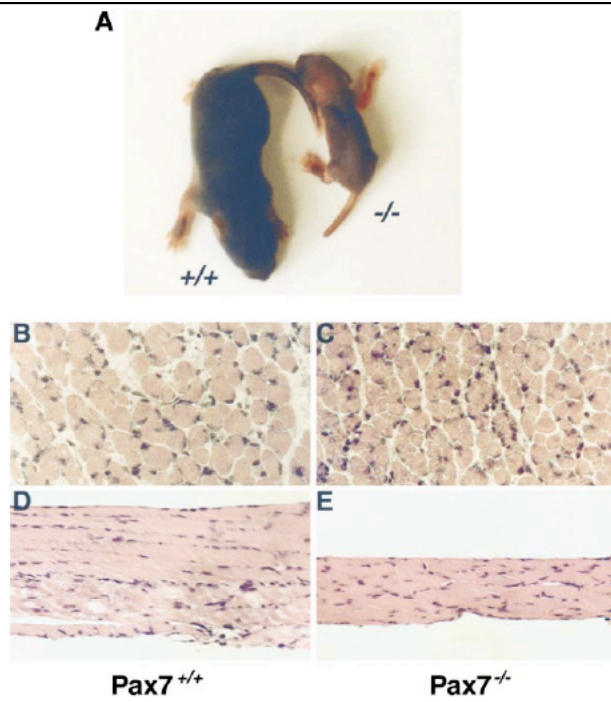
Dystrophin expression in a mdx mouse!

Gussoni et al., 1999

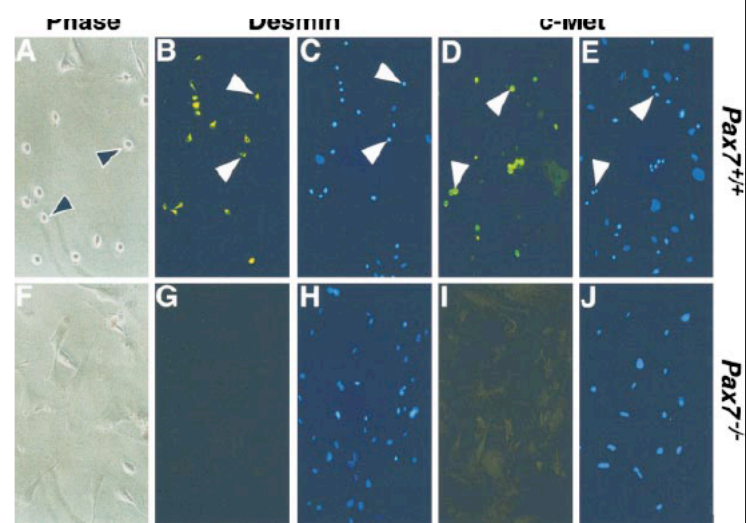




Pax7 mutants are small



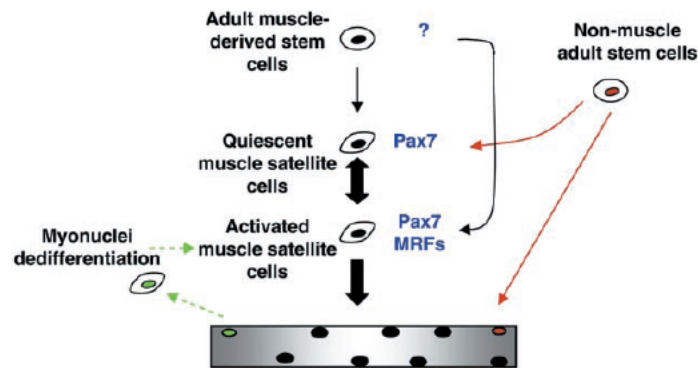
Pax 7 mutants have no myoblasts



LETTERS

Adult satellite cells and embryonic muscle progenitors have distinct genetic requirements

Christoph Lepper^{1,2}, Simon J. Conway³ & Chen-Ming Fan¹

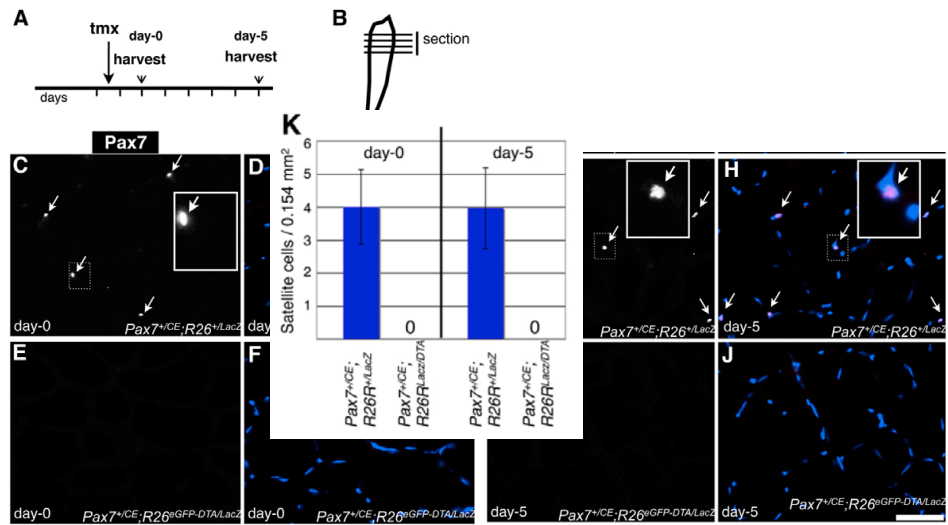


An absolute requirement for Pax7-positive satellite cells in acute injury-induced skeletal muscle regeneration

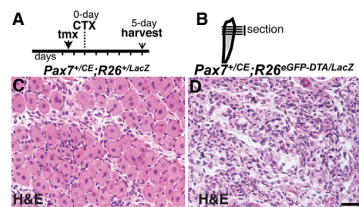
Christoph Lepper¹, Terence A. Partridge² and Chen-Ming Fan^{1,*}

Lepper, et al., 2011

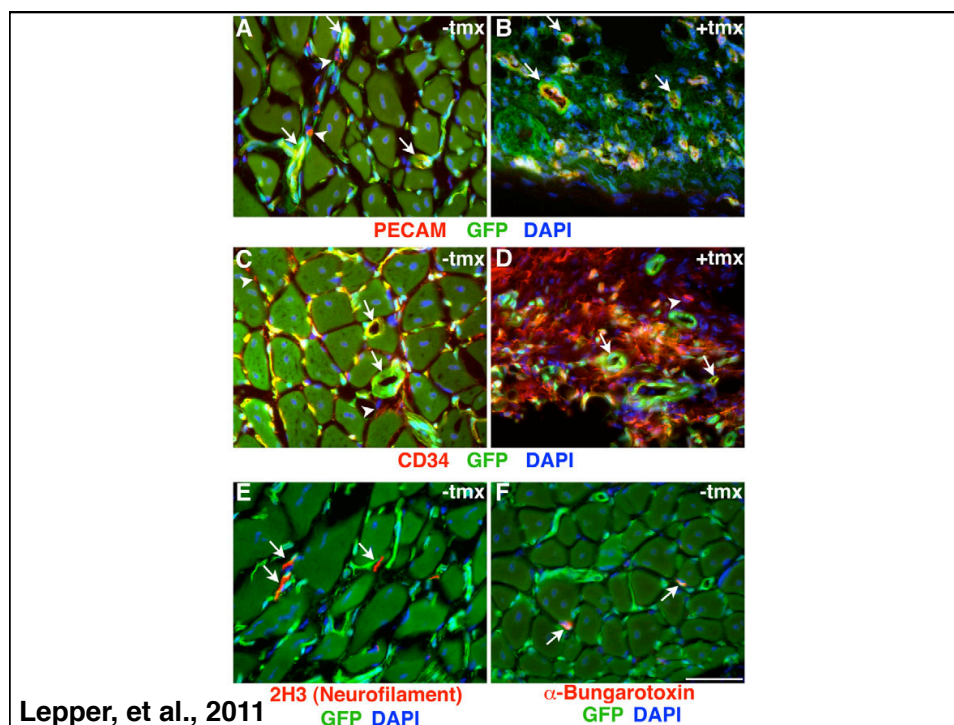
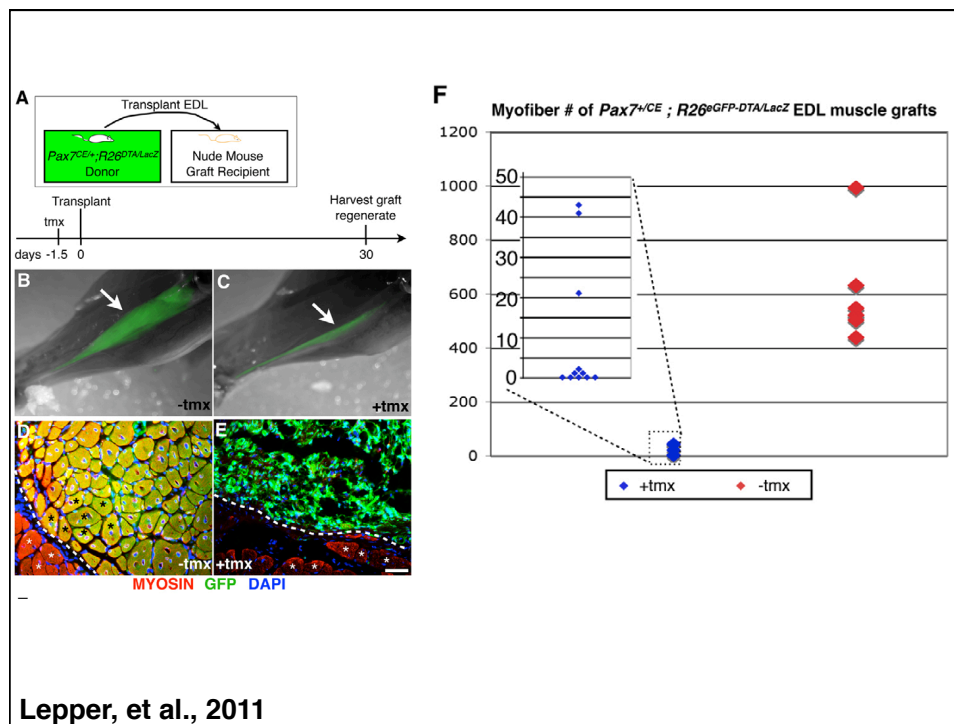
Ablation of Satellite cells.



Lepper, et al., 2011



Lepper, et al., 2011



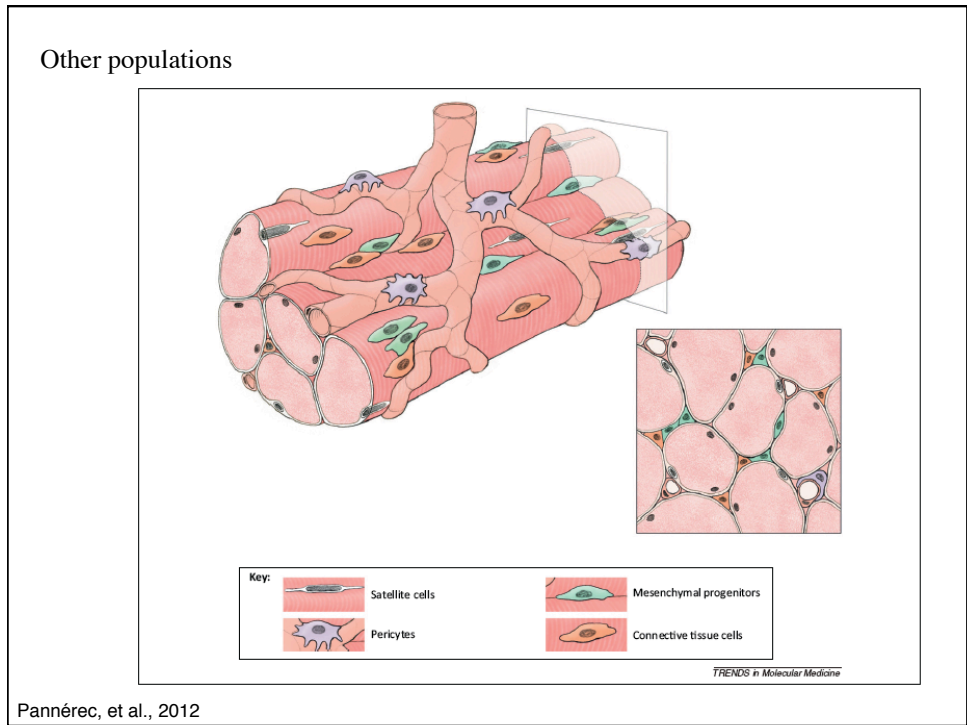
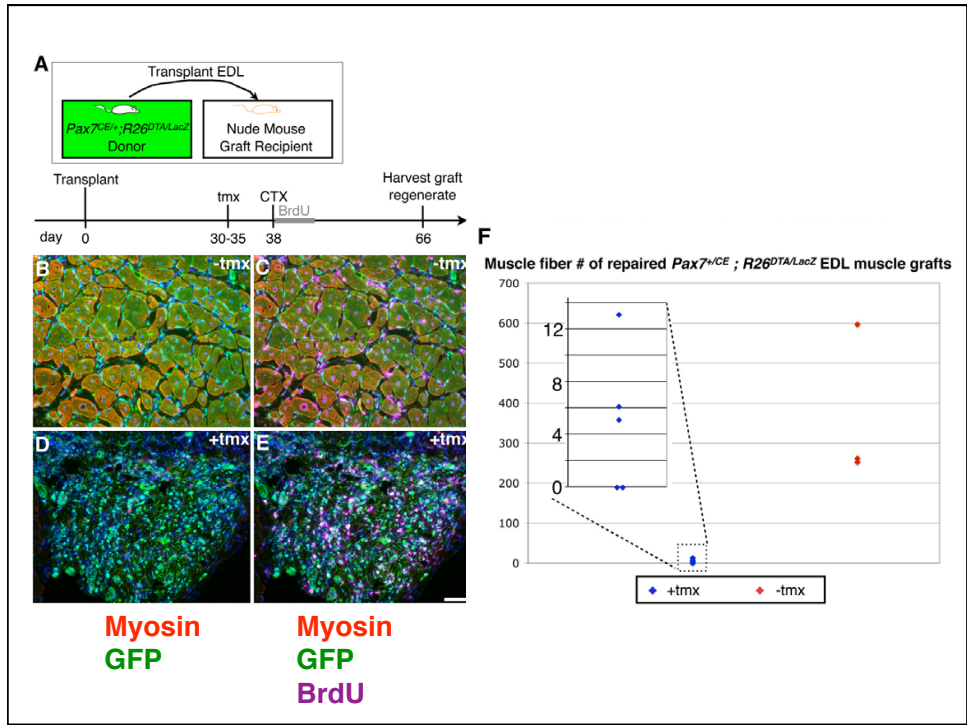


Table 1. Comparative capacities of myogenic progenitor cells

Cell type	Markers	Proliferation <i>in vitro</i>	Systemic delivery	Repopulation of the satellite cell niche	Transplantation efficiency (number or % of positive myofibers, TA)*	Improvement of muscle disease	Refs
Satellite cells	Pax7, CD34, c-met	High	No	Yes	>500 fibers (i.m)	<i>mdx</i> mice	[4,88]
SP	Hoechst exclusion, CD45, Sca1	Low	Yes	Yes	<50 (8%) (i.a.)	<i>mdx</i> mice	[9]
CD133+ cells	CD133, CD34, Thy1, CD45	Low	Yes	Yes	50–100 fibers (i.a)	<i>mdx</i> mice	[15]
Mabs	CD34, c-kit, Flk1	High	Yes	??	>20% (i.a)	α -sarco mice, dystrophic dogs	[23,24]
Pericytes	AP, NG-2 proteoglycan	High	Yes	Yes	300–500 i.a, 20 i.m	<i>mdx</i> mice	[25]
PICs	PW1	Low	Not tested	Yes	60% (i.m)	Not tested	[17]
β 4 integrin+ cells	β 4 integrin	High	Not tested	??	50–100 (5–10%) (i.m)	<i>mdx</i> mice	[19]

*Abbreviations: i.a., intra arterial; i.m., intramuscular.

Pannérec, et al., 2012