

# Dave Neary

@nearyd

dneary@redhat.com



## Hacking your body

Running as performance tuning

# Marseille-Cassis

29 October 2006

**Rank: 6580/13000**  
**Official time: 2:02:24**  
**Revised time: 2:01:13**



# MARATHON DE LYON

## Lyon 10km 29 April 2007

**Rank: 985/3473**  
**Official time: 49:23**  
**Revised time: 48:50**

VOLLE A. 46mn 16s; 600. KRUG A. 46mn 16s;  
601. ENNAJIHI A. 46mn 17s;  
602. BAUDET J. 46mn 17s; 603. DORGHAN B. 46mn 17s;  
MIRONNEAU C. 46mn 17s; 604. DREVON-GILLES E. 46mn 18s;  
606. REYNAUD F. 46mn 18s; 607. MARILLIER J. 46mn 19s; 608. ROULLET V. 46mn 19s; 609. PINAULT J. 46mn 21s; 610. BONNIN C. 46mn 21s; 611. BITAU-DEAU N. 46mn 22s; 612. PAYEBIEN F. 46mn 22s; 613. PEYAUD F. 46mn 23s; 614. VALETTE J. 46mn 23s; 615. HAEMMERER S. 46mn 24s; 616. BOUHILA A. 46mn 24s; 617. RIZET B. 46mn 24s; 618. BARBERY C. 46mn 26s; 619. DARD J. 46mn 26s; 620. SURGEY M. 46mn 26s;  
621. MAESTRI S. 46mn 27s; 622. BEL A. 46mn 28s; 623. DODET B. 46mn 28s; 624. GONTHIER C. 46mn 29s; 625. NAMIAN C. 46mn 31s; 626. CHAUMONT J. 46mn 31s; 627. GAGNAI J. 46mn 31s; 628. MINODIER N. 46mn 32s; 629. BERNET D. 46mn 32s; 630. GYPFAZ F. 46mn 33s; 631. COURTADON-SORIN J. 46mn 34s; 632. COURTADON-SORIN S. 46mn 36s; 633. HIRSO J. 46mn 37s; 634. MONJOUIS-BONNAIRE H. 46mn 40s; 636. PARENT F. 46mn 43s; 637. KOUASSI J. 46mn 44s; 638. WAGARI B. 46mn 45s; 639. BOLZE N. 46mn 45s; 640. GOUBER Y. 46mn 45s;  
641. CHORFA A. 46mn 45s; 642. CERVERA F. 46mn 47s; 643. JAUBERT L. 46mn 47s; 644. VILBOUX A. 46mn 48s; 645. FRANCILLON P. 46mn 50s; 646. PETITJEAN S. 46mn 51s; 647. JIMBERT C. 46mn 51s; 648. LEROY P. 46mn 52s; 649. BEAL D. 46mn 52s; 650. LALICHE H. 46mn 53s; 651. VERRIERE J. 46mn 53s; 652. MOINE V. 46mn 54s; 653. QUATROCCHI O. 46mn 54s; 654. MERCIER-VINCENT V. 46mn 57s; 655. BRISSEAU C. 46mn 57s; 656. MAMOUNI A. 46mn 58s; 657. TRAMMA M. 46mn 58s; 658. COMBE R. 46mn 58s; 659. MICHEO

724. POUSSIER M. 47mn 29s; 725. AUBERT J. 47mn 29s; 726. EMORINE A. 47mn 29s; 727. CORNELIUS P. 47mn 31s; 728. JAGORS F. 47mn 31s; 729. JONHN O. 47mn 31s; 730. MULLETON L. 47mn 32s; 731. BERGIA N. 47mn 32s; 732. BASTIS J. 47mn 33s; 733. COTTEL L. 47mn 33s; 734. N. DALY J. 47mn 33s; 735. BOLEVY L. 47mn 33s; 736. CIBOT P. 47mn 33s; 737. FEIO F. 47mn 33s; 738. CONCHIN F. 47mn 34s; 739. ANGUENOT B. 47mn 34s; 740. DELACRE J. 47mn 35s;  
741. DECLOITRE P. 47mn 35s; 742. XAVIER D. 47mn 35s; 743. GIRARD C. 47mn 36s; 744. BOISSET P. 47mn 36s; 745. HEBERT C. 47mn 36s; 746. GIRARD A. 47mn 36s; 747. PETEY J. 47mn 37s; 748. LUGAZ F. 47mn 38s; 749. RUSSIER H. 47mn 38s; 750. DURIN E. 47mn 38s; 751. CUO O. 47mn 39s; 752. N. D. 47mn 39s; 753. MAGNAN H. 47mn 39s; 754. MAGNAN N. 47mn 40s; 755. FRAISSE B. 47mn 40s; 756. BOULLOUX J. 47mn 40s; 757. NALLY A. 47mn 42s; 758. NALLY A. 47mn 42s; 759. GRIFFON P. 47mn 43s; 760. LEONE JEAN Y. 47mn 44s;  
762. MEZAACHE A. 47mn 44s; 763. PACCAUD P. 47mn 44s; 764. FEIDT N. 47mn 45s; 765. ATILEMILLE F. 47mn 46s; 766. TANCZAK J. 47mn 46s; 767. BEROU D. 47mn 46s; 768. GROBOZ A. 47mn 47s; 769. HUYGHE G. 47mn 47s; 770. DEMUYTER D. 47mn 48s; 771. VERMARE D. 47mn 48s; 772. SANLAVILLE G. 47mn 49s; 773. ALAMI Z. 47mn 49s; 774. ZAHAN G. 47mn

801. VAZILLE S. 48mn 5s; 802. MEUNIER P. 48mn 6s; 803. SCOTTON P. 48mn 6s; 804. ABDELMAFID M. 48mn 6s; 805. OUT S. 48mn 6s; 806. LAFAY B. 48mn 6s; 807. MENEZ O. 48mn 7s; 808. FARJAT P. 48mn 7s; 809. MARSAN J. 48mn 7s; 810. MONTAGNE P. 48mn 7s; 811. CAMARATA J. 48mn 7s; 812. FILIOT M. 48mn 7s; 813. BAC CAM D. 48mn 8s; 814. ZAMBITO J. 48mn 8s; 815. BOCHIT A. 48mn 8s; 816. THIRION E. 48mn 8s; 817. FRAISSINET M. 48mn 9s; 818. CHAU S. 48mn 10s; 819. MARGUIN V. 48mn 10s; 820. HEURTAULT D. 48mn 11s;  
821. LION F. 48mn 11s; 822. KAPIKIAN G. 48mn 12s; 823. CARVALHO A. 48mn 12s; 824. PETIT R. 48mn 13s; 825. DURIEUX Y. 48mn 14s; 826. BOUYEYRON F. 48mn 14s; 827. GIUPPONI F. 48mn 14s; 828. LETOURNEUR C. 48mn 15s; 829. PINARD P. 48mn 15s; 830. GROS K. 48mn 16s; 831. BERTHOLT L. 48mn 16s; 832. PIN F. 48mn 16s; 833. BOUADJAR B. 48mn 16s; 834. BERTHAUD D. 48mn 18s; 835. CASSAGNE S. 48mn 19s; 836. POUSSAIN G. 48mn 20s; 837. PERCET J. 48mn 20s; 838. GEOFFROY T. 48mn 21s; 839. BAROU M. 48mn 21s; 840. DADET F. 48mn 21s;  
841. CRESPE J. 48mn 22s; 842. CHESNEL D. 48mn 22s; 843. KAROU N. 48mn 22s; 844. LAURENT B. 48mn 23s; 845. MARTINEZ L. 48mn 25s; 846. BALLAZ Y. 48mn 25s; 847. BONNAT J. 48mn 26s; 848. SOUFFLET B. 48mn 26s; 849. THIAUCOURT J. 48mn 26s; 850. CHAZOT J. 48mn 26s; 851.

E. 48mn 43s; 880. GRILLAT G. 48mn 44s;  
881. MAROT F. 48mn 44s; 882. DEFAY G. 48mn 44s; 883. GUERIN N. 48mn 44s; 884. TRAMMA A. 48mn 44s; 885. YACOUBOU M. 48mn 44s; 886. PARENTHOEN Y. 48mn 44s; 887. BACHAT C. 48mn 45s; 888. DIROLLO M. 48mn 45s; 889. TEN-HAVE K. 48mn 46s; 890. AUBOYER G. 48mn 46s; 891. FERRAGU C. 48mn 46s; 892. GAYE D. 48mn 47s; 893. LARRAS D. 48mn 47s; 894. DANTHENY T. 48mn 48s; 895. CAPRON R. 48mn 48s; 896. SUPPLISSON A. 48mn 48s; 897. BURDEYRON D. 48mn 48s; 898. PICCA R. 48mn 49s; 899. FONTANA J. 48mn 49s; 900. CORDIER G. 48mn 49s;  
901. FRETET D. 48mn 50s; 902. ROCHE J. 48mn 50s; 903. FRANCHINO G. 48mn 50s; 904. BELBAHRI Y. 48mn 50s; 905. CHARLES N. 48mn 50s; 906. LANDRIEU P. 48mn 51s; 907. THIEBAUT A. 48mn 52s; 908. MARTHOU L. 48mn 52s; 909. BONNARD E. 48mn 52s; 910. DEMEO C. 48mn 52s; 911. DUMAS S. 48mn 52s; 912. CRAVO D. 48mn 53s; 913. DERUBAY J. 48mn 53s; 914. DEROCHE F. 48mn 54s; 915. GRELLIER S. 48mn 54s; 916. PEREZ J. 48mn 55s; 917. RAMBAUD G. 48mn 55s; 918. LUU M. 48mn 56s; 919. KETTEMAYER H. 48mn 56s; 920. VIELLARD L. 48mn 56s;  
921. ALLONCLE E. 48mn 57s; 922. KHAMTACHE G. 48mn 58s; 923. DEGRAIX J. 48mn 58s; 924. CANTIN D. 48mn 59s; 925. LAMY J. 49mn 0s; 926. MICHON S. 49mn 1s; 927. BEAL M. 49mn 1s; 928.

12s; 958. RIDARCH R. 49mn 13s; 959. FILLARDET F. 49mn 14s; 960. LAURENT F. 49mn 14s;  
961. LIER D. 49mn 14s; 962. MONOT E. 49mn 15s; 963. GALVAO M. 49mn 15s; 964. BERNARD L. 49mn 16s; 965. TOULOUSE B. 49mn 16s; 966. THEVENIN L. 49mn 16s; 967. LAURENT Y. 49mn 16s; 968. VALLENTIN C. 49mn 17s; 969. HAMM C. 49mn 17s; 970. PEYROL O. 49mn 17s; 971. RUIZ J. 49mn 18s; 972. DUMAS M. 49mn 19s; 973. HAPCHETTE L. 49mn 19s; 974. BERDA D. 49mn 19s; 975. RYMARZ S. 49mn 19s; 976. DUCHESNE L. 49mn 20s; 977. NEU G. 49mn 20s; 978. NOUGAREDE R. 49mn 20s; 979. MERLET B. 49mn 21s; 980. BUISSON Q. 49mn 21s;  
981. DE MEDTS F. 49mn 22s; 982. AZZIS H. 49mn 22s; 983. CAREY D. 49mn 22s; 984. VERNAZ-PETIT-CLAUDE C. 49mn 22s; 985. NEARY D. 49mn 23s; 986. COQUET H. 49mn 23s; 987. DIANTONY N. 49mn 25s; 988. MERY J. 49mn 25s; 989. GARREL F. 49mn 25s; 990. JOIGNANT T. 49mn 26s; 991. BOZOYAN J. 49mn 26s; 992. MATHY B. 49mn 26s; 993. BALLY L. 49mn 26s; 994. MAGNOLON L. 49mn 26s; 995. KLEBER I. 49mn 26s; 996. DOUGERE C. 49mn 27s; 997. GODESKY W. 49mn 27s; 998. GELINEAU D. 49mn 28s; 999. SARAGOZA M. 49mn 28s; 1000. GONNET J. 49mn 28s;  
1001. LEFORT P. 49mn 28s; 1002. LANDRY J. 49mn 28s; 1003. BOURIAT C. 49mn 29s; 1004. MAGNON D. 49mn 29s; 1005. ARNAULT G. 49mn 29s; 1006. BERRY R. 49mn 29s; 1007. DRURY G. 49mn 29s; 1008. LEPRETRE D. 49mn 30s; 1009. CARRERAS F. 49mn 30s; 1010. CRAMARD O. 49mn 32s; 1011. RAPHAEL E. 49mn 32s; 1012. PERRET-GROBOZ N. 49mn 32s; 1013. PETITBON B. 49mn 33s; 1014. LAMBERT L. 49mn 33s; 1015. THEVENON D. 49mn 33s; 1016. FAVROT J. 49mn 33s; 1017.



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Neale W. 1446, 1h37'0". Neary D. 868, 1h32'12". Neau X. 888, 1h32'21". Necas E. 8063, 2h6'33". Nedelec M. 7042, 2h2'25". Nedza C. 771, 1h30'56". Neel P. 7142, 2h2'48". Neffati A. 11244, 2h22'26". Negosanti J. 161, 1h20'0". Negosanti P. 7424, 2h3'52". Negre R. 7593, 2h4'35". Negre S. 1445, 1h36'59". Negri F. 6552, 2h0'34". Ne-



Marseille-Cassis  
28 October 2007

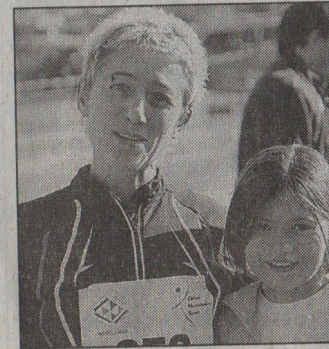
# 29<sup>e</sup> Foulée Vénissiane : les amateurs se font plaisir

Record de participation battu pour la 29<sup>e</sup> édition, avec près de 1 000 engagés, toutes courses confondues



Le départ du 10 km, toujours un moment fort de cette Foulée Vénissiane

/ Photo Carlos Soto



**Camille  
Varesi**

La jeune athlète de Saint-Romain-en-Gal cours depuis seulement une année. Pour sa première participation à la Foulée Vénissiane, en 45'25, elle se qualifie pour les dix kilomètres du championnat de France : « Je suis super-heureuse » murmure-t-elle.



## 18 November 2007

## Time: 40:51



**What changed?**

# **1. Run faster**

# semaine 29

DU 16 AU 22 JUILLET

# semaine 30

DU 23 AU 29 JUILLET

	forme	km	durée en mn	type d'entraînement	météo	remarques
lundi 16/07	poids					
	pulsations / mn					
mardi 17/07	poids	11	1h15	4x 1000, 4.42 4.28 4.25 <u>3.53</u>		au club Mart à la fin
	pulsations / mn					
mercredi 18/07	poids					
	pulsations / mn					
jeudi 19/07	poids	8	1h	7x 550 @ 2.05 30° rep.		2:01 2:03 2:01 2:03 2:07 2:11 2:07
	pulsations / mn					
vendredi 20/07	poids					
	pulsations / mn					
samedi 21/07	poids					
	pulsations / mn					
dimanche 22/07	poids	12	75	12 km @ 10km/h forçier		Très lent.
	pulsations / mn					
total semaine		34				

## 2. Interval training

	forme	km	durée en mn	type d'entraînement	météo	remarques
lundi 23/07	poids					
	pulsations / mn					
mardi 24/07	poids					
	pulsations / mn					
mercredi 25/07	poids		39	Tour d'aclanff + Tour rapide + LAC		PL faut que je maîtrise ma vitesse
	pulsations / mn	100	16.10			
jeudi 26/07	poids			1x 1200 @ 4.43 2x 600 @ 2.14 3x 400 @ 1.25		good session
	pulsations / mn					
vendredi 27/07	poids					
	pulsations / mn					
mercredi 28/07	poids			Sea arrived!		
	pulsations / mn					
jeudi 29/07	poids					
	pulsations / mn					
total semaine		20				

juillet



Un test à l'effort vous donnera toutes les informations sur votre condition physique. Il est recommandé pour la pratique de la course à pied. Renseignez-vous chez l'opérateur.



CHAUSSETTES DE RÉCUPÉRATION POUR FACILITER LE RETOUR VEINEUX DES JAMBES LOURDES.

**THUASNE**  
**SPORT**

# Aside: Amdahl's Law

Two independent parts

**A** **B**

Original process



Make **B** 5x faster



Make **A** 2x faster

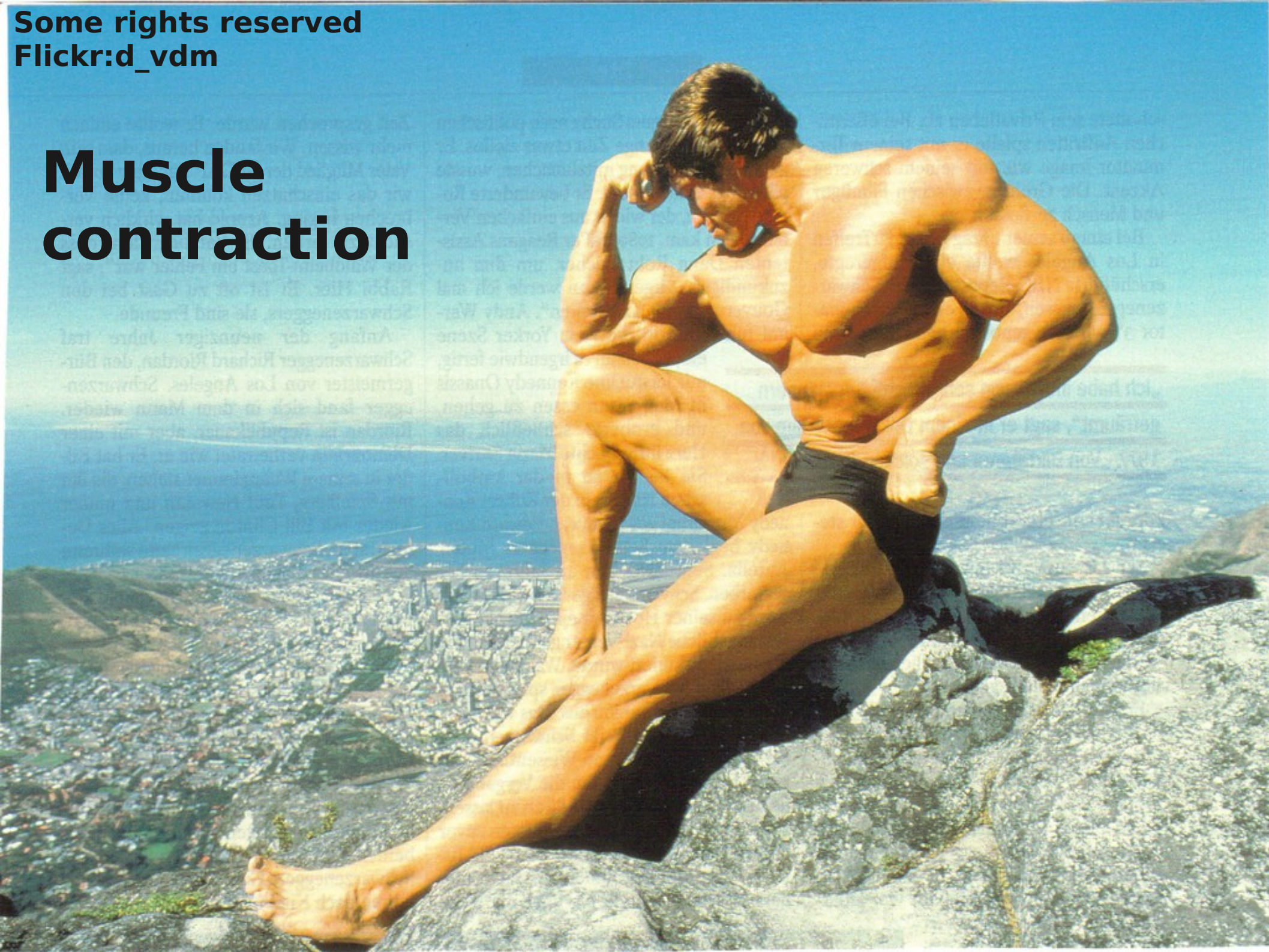


$$\text{maximum speedup} \leq \frac{p}{(1 + f \cdot (p - 1))}$$

**How do we run?**

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Flickr:d\_vdm

# Muscle contraction

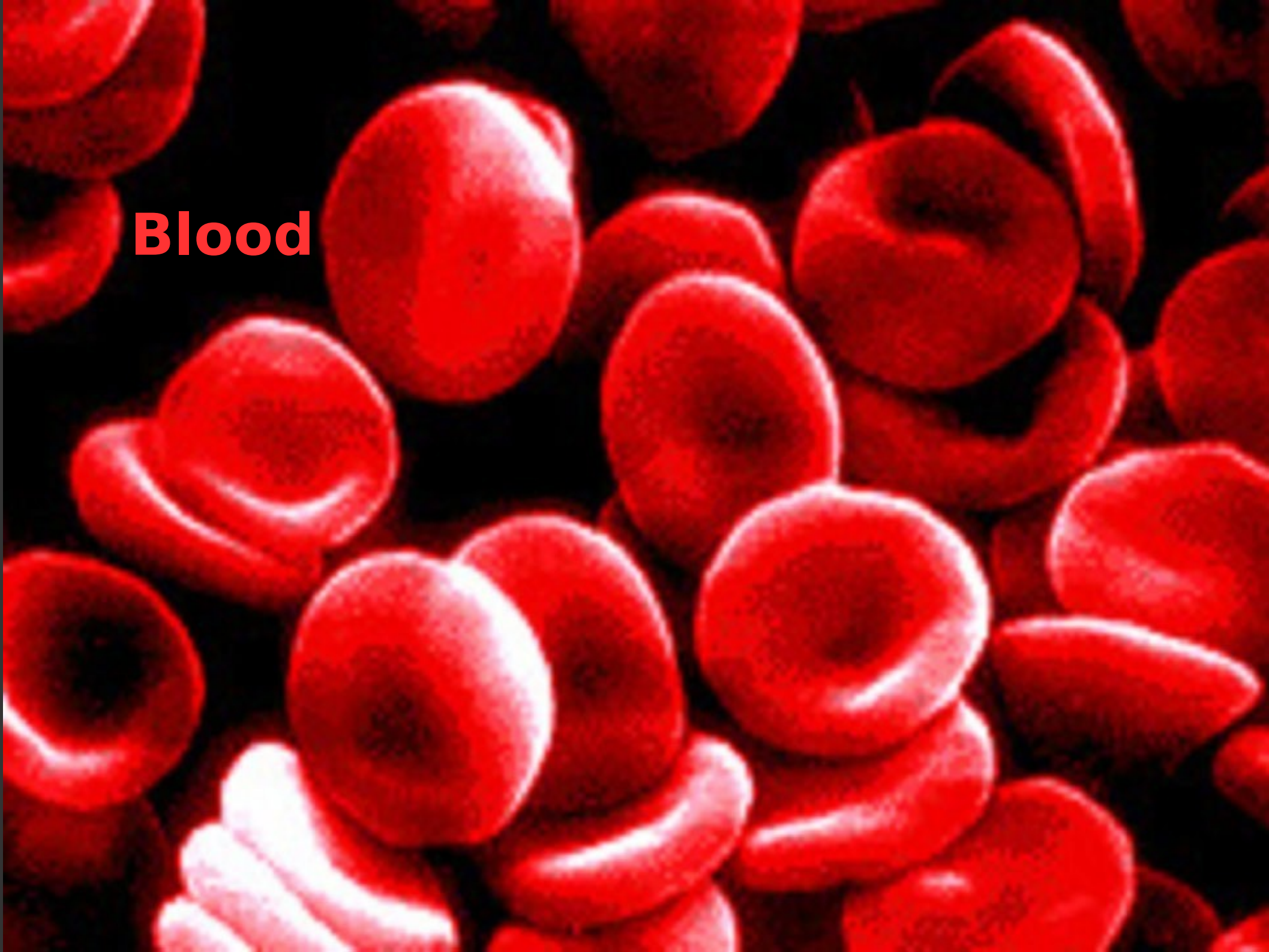


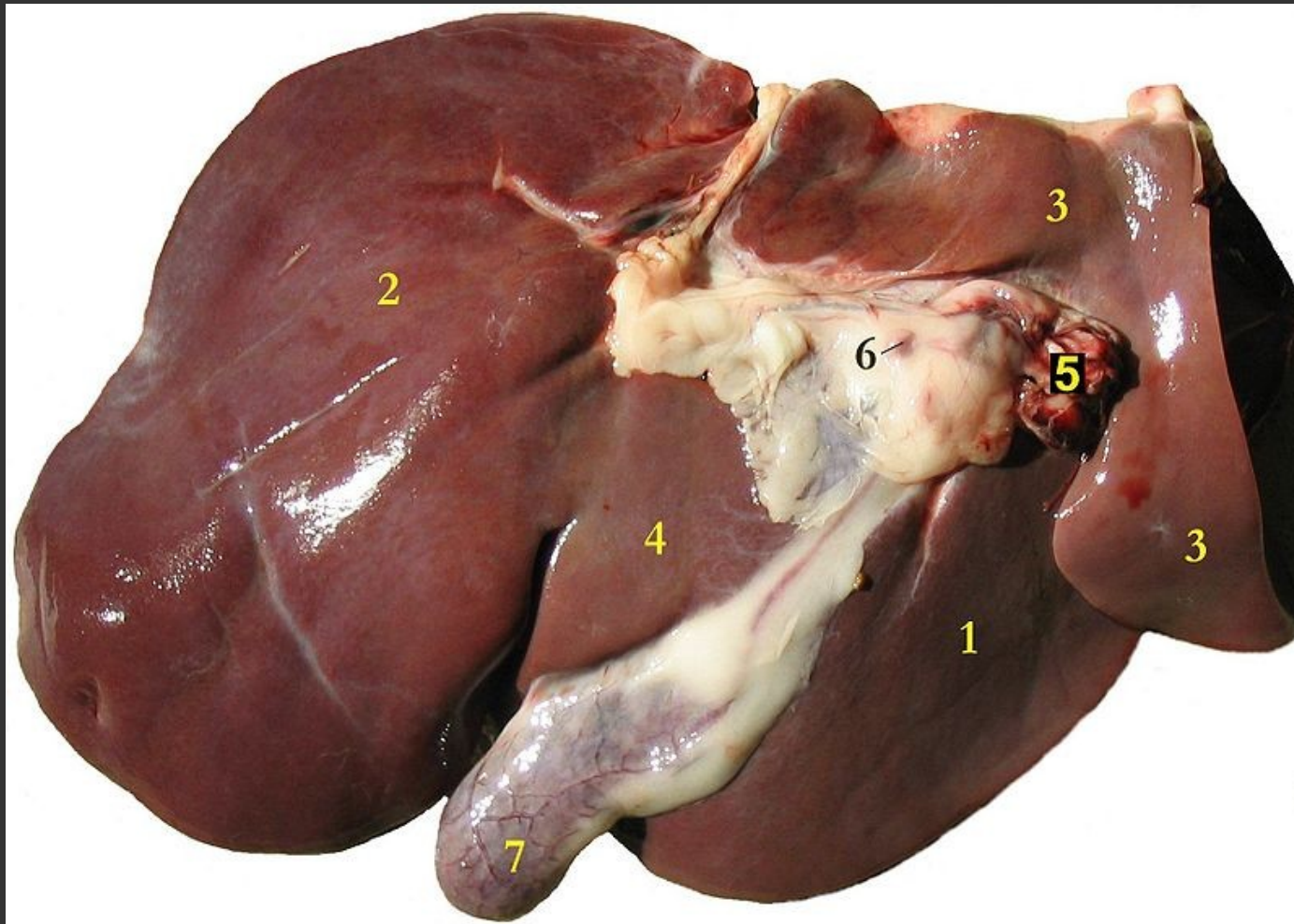
# ATP production

- Glycolysis:  $O_2$  + sugars or fats
- Anaerobic respiration: No  $O_2$

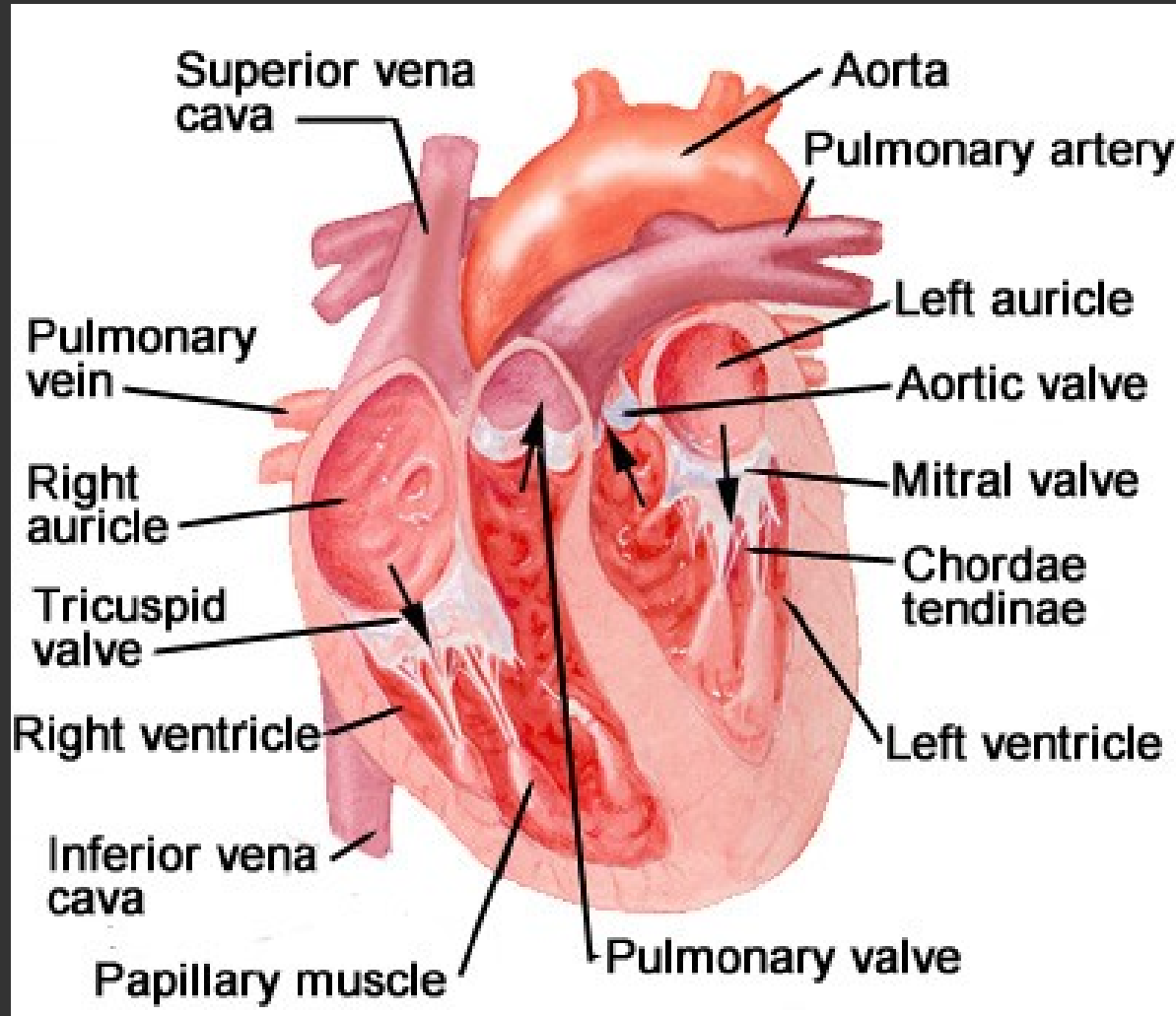
For all the gory details, watch  
“Sugar, the Bitter Truth”  
by Dr. Robert Lustig

**Blood**

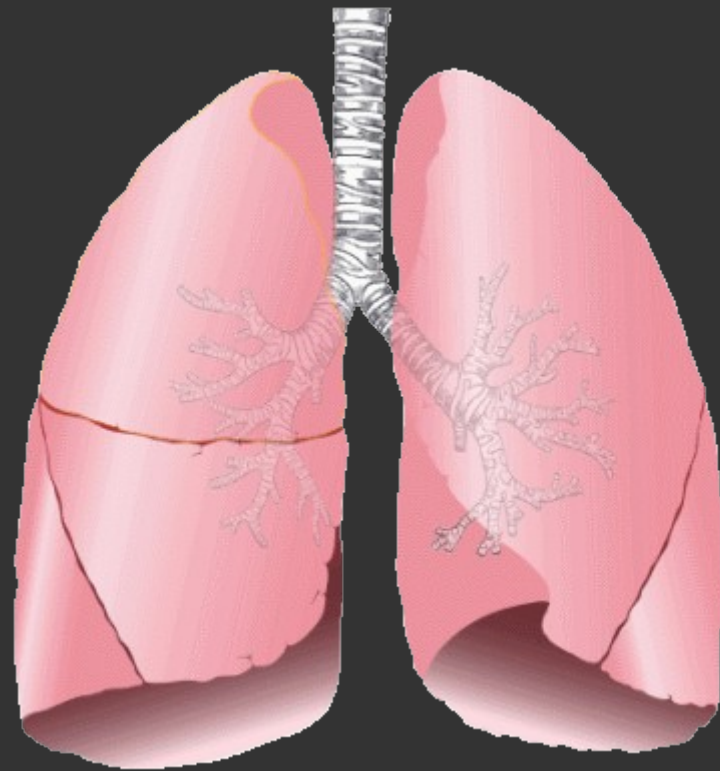




**The Liver**



# Heart



**Lungs**

# Uncontrollables

**Controllables**

# ATP creation

- $O_2$  concentration in blood
- Heart rate, stroke volume
- Lung capacity
- Glycogen stocks

# ATP consumption

- Strength
- Weight
- Running economy
- Lactic tolerance

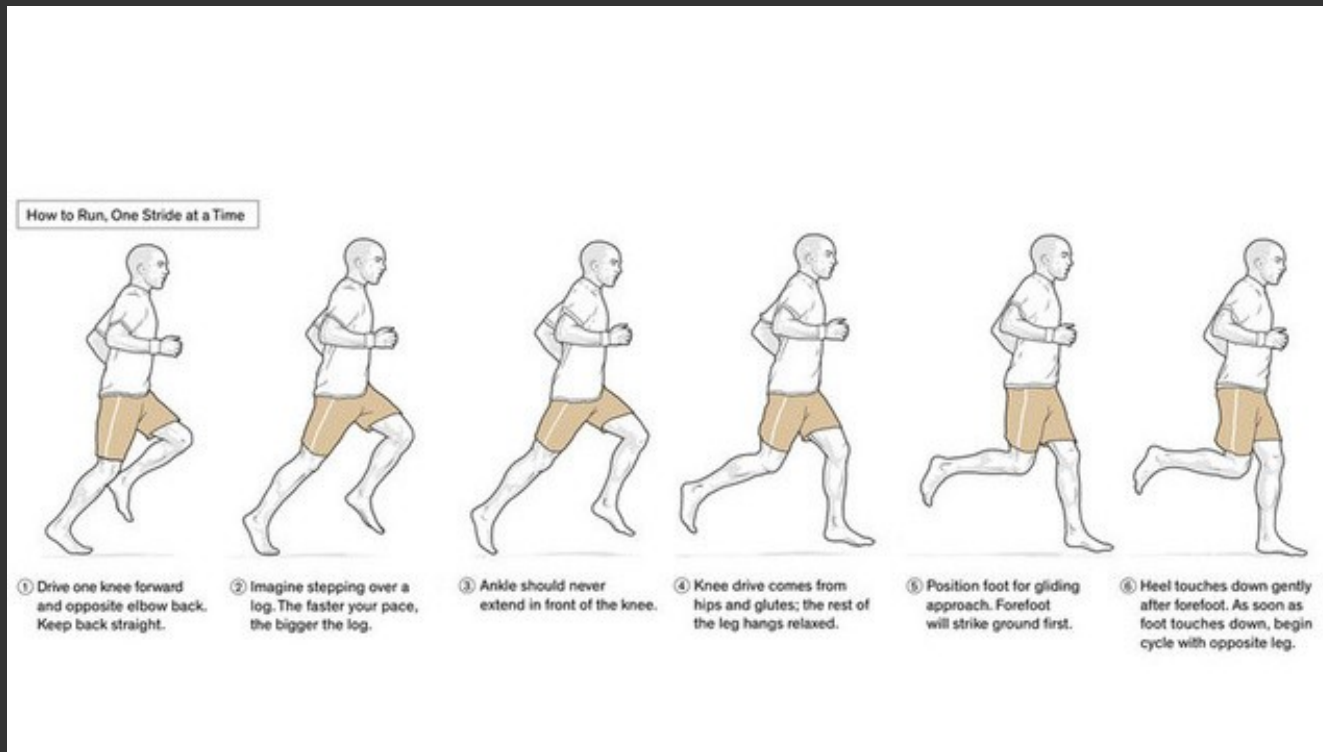
# Glycogen stocks





# Running economy

- “Form”
- Strength
- Suppleness



# **A word on injury prevention**

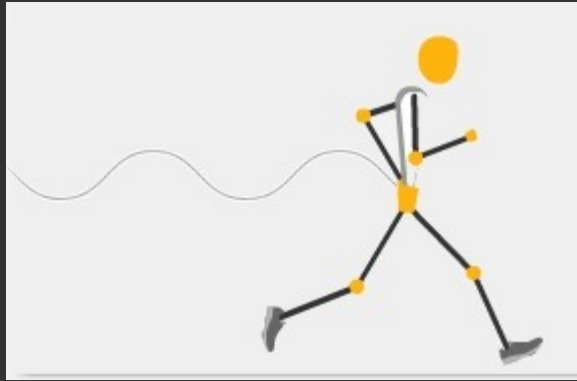


Injured people can't run fast

**10%**

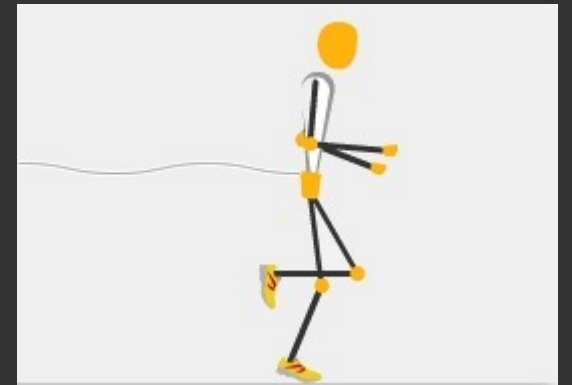


**Stretching**



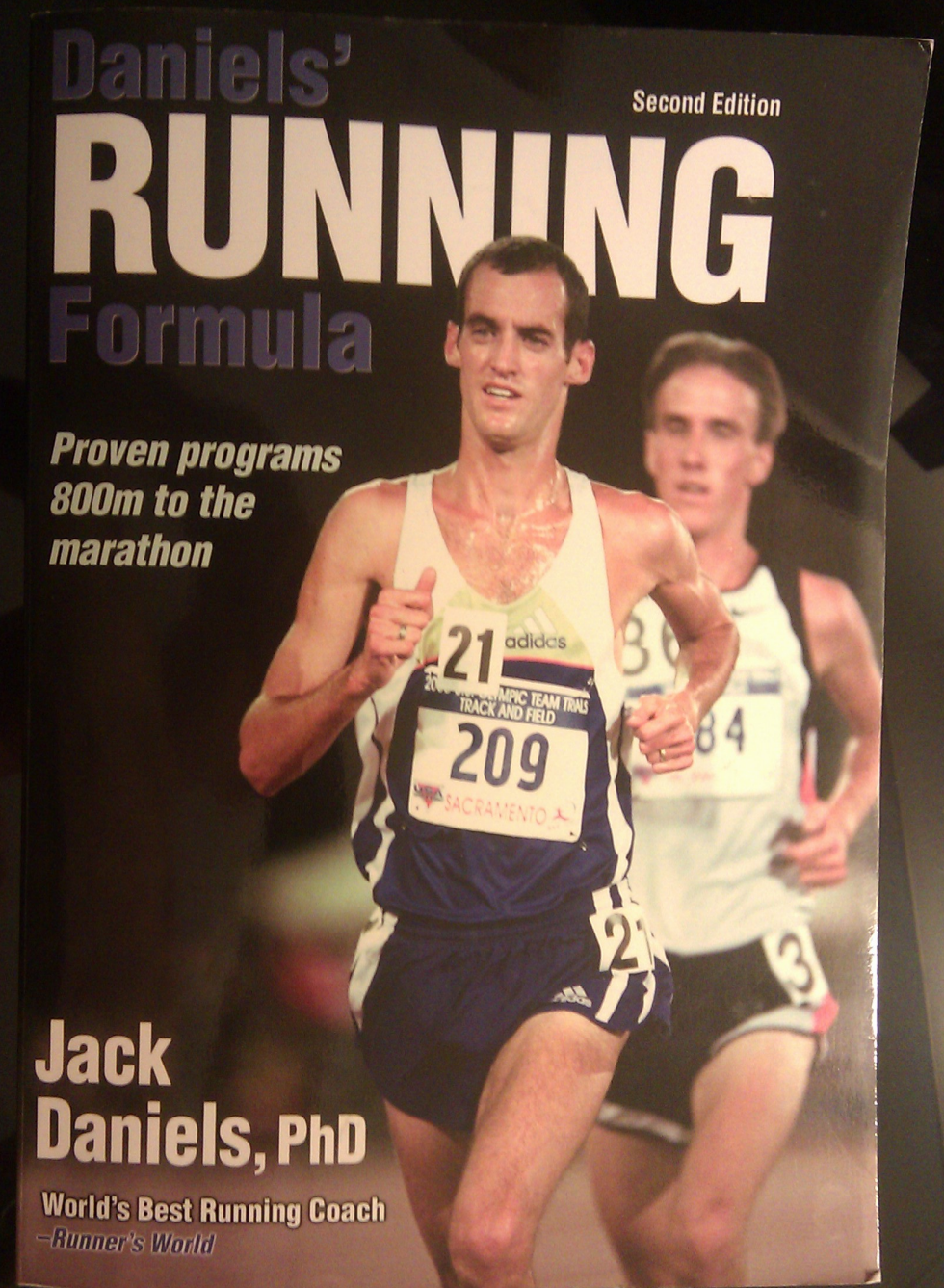
Heel  
strike

Forefoot  
strike



# **Cardio-vascular efficiency**

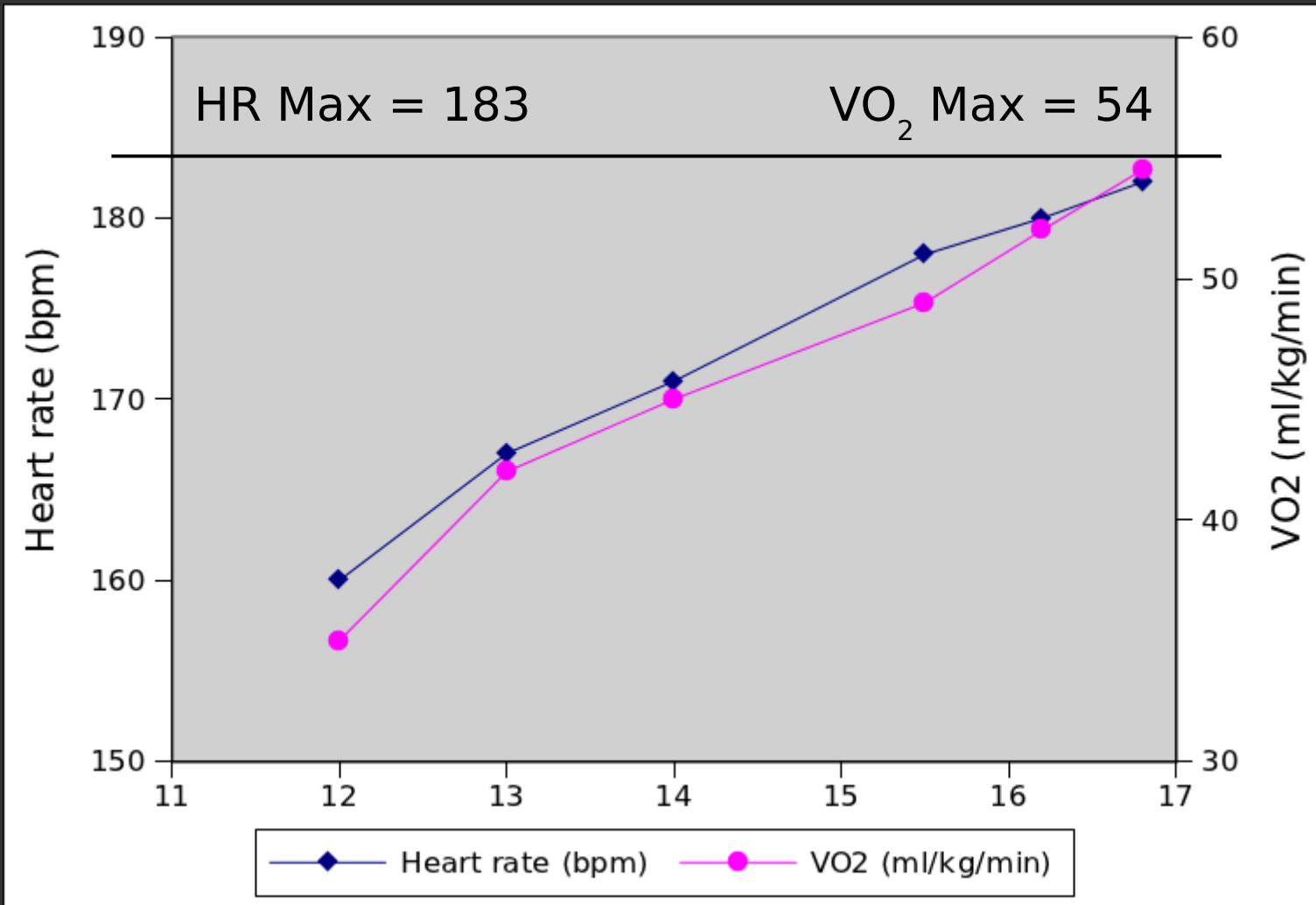
Calling Dr. Daniels  
Dr. Jack Daniels



# **Introducing the Magic Number: VO2 Max**



$\text{ml.kg}^{-1}.\text{min}^{-1}$



HR & VO<sub>2</sub> vs speed (km/h)

# Measuring $\text{VO}_2$ Max



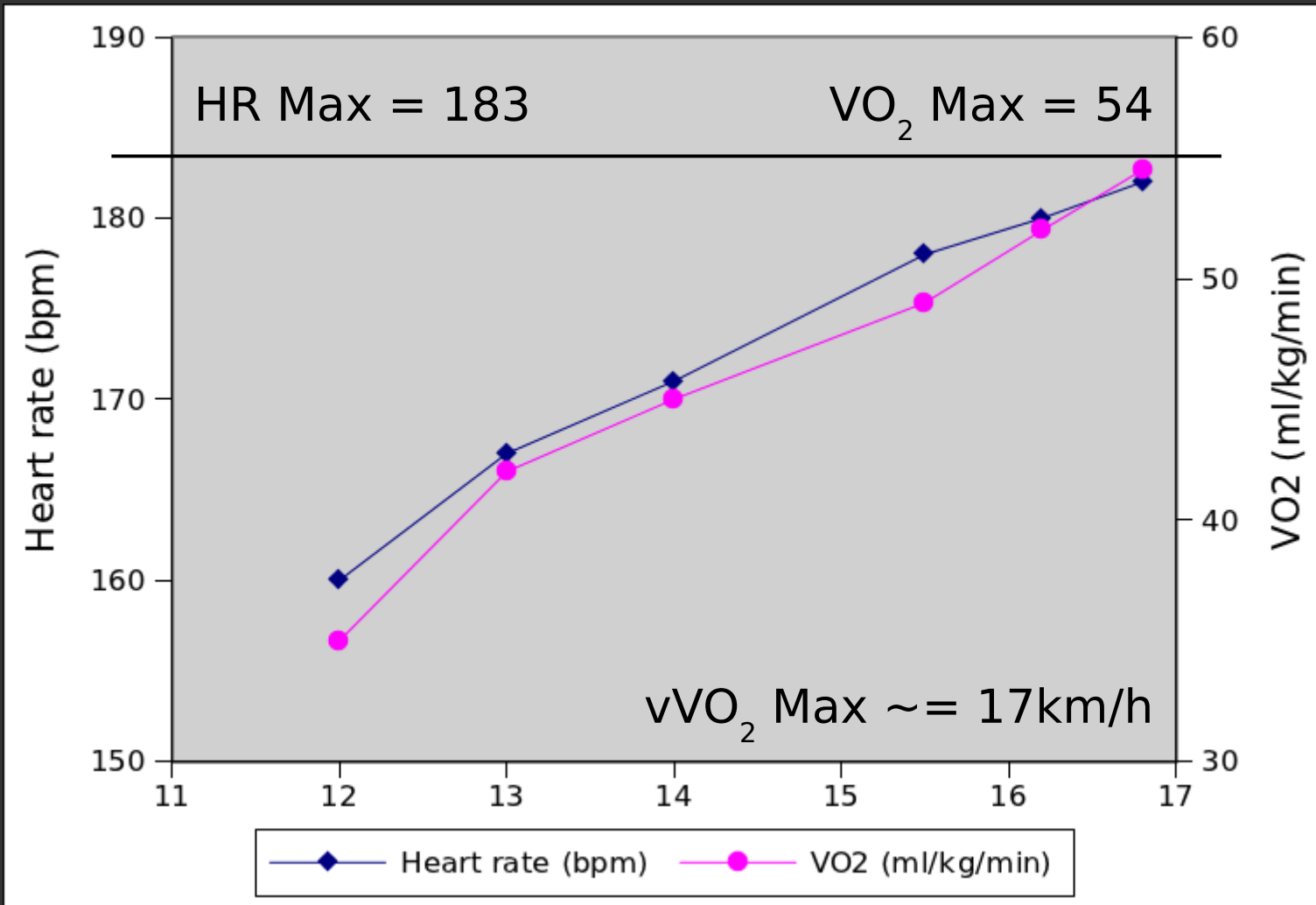


A good GPS: \$400  
(or run with your smartphone)



A good stopwatch: \$30

$v\text{VO}_2$  Max



HR & VO<sub>2</sub> vs speed (km/h)

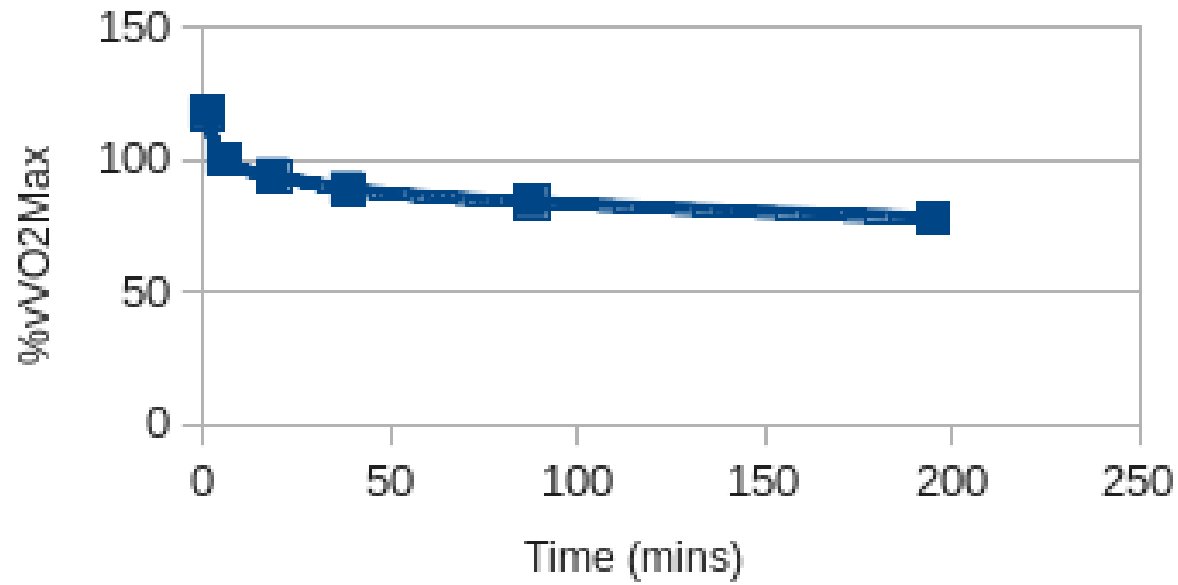
# VAM Eval

- Beep test
- Markers every 20m
- Speed increases 0.5km/h per minute

# Semi-Cooper

- Warm up, and run fast for 6 mins
- $v\dot{V}O_2 \text{ Max (km/h)} \sim = \text{distance (in m)}/100$
- Systematically underestimates (0.5-1 km/h)

Improving your  $\text{VO}_2$  Max



Effort vs time

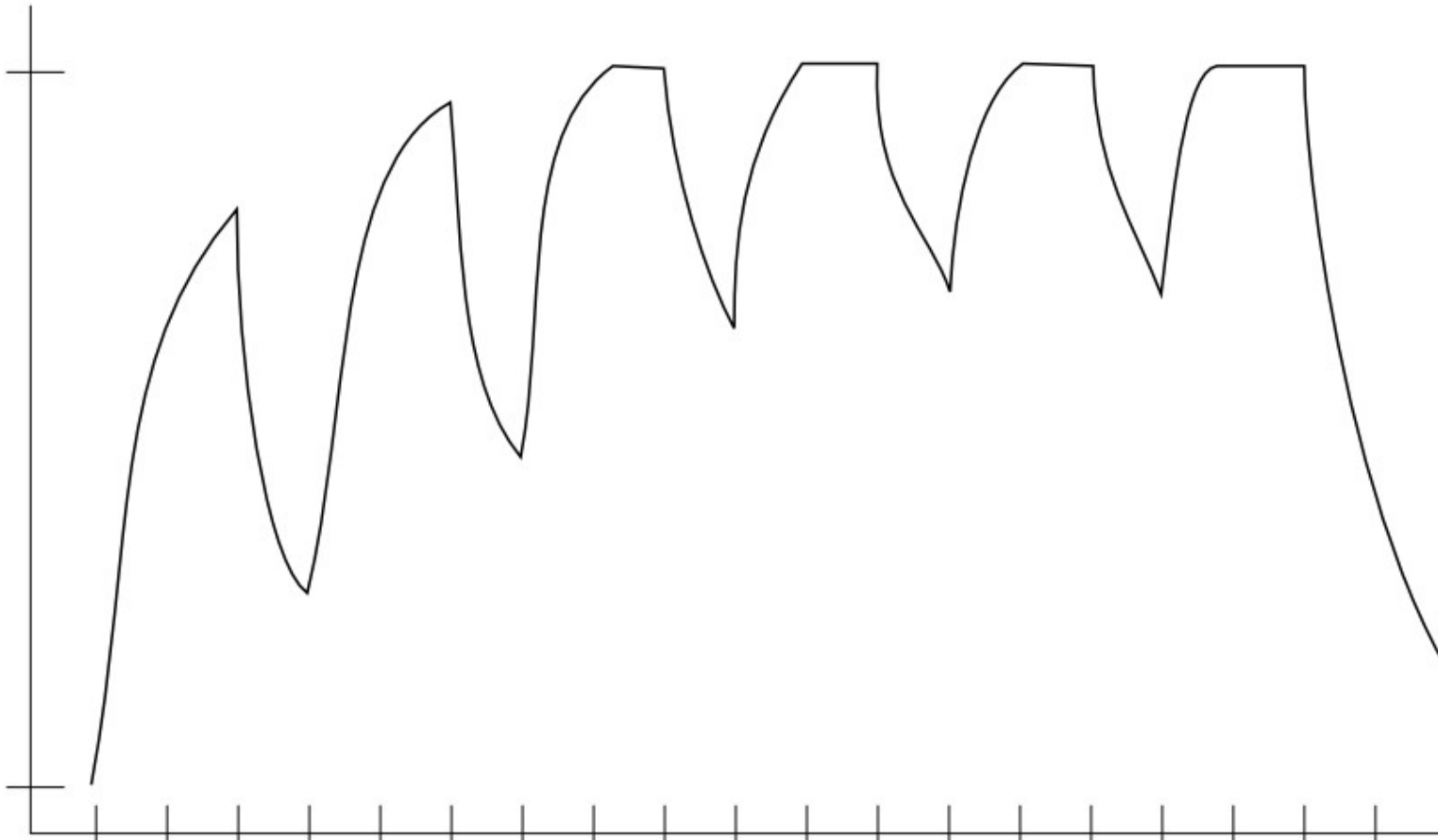
# Interval training

VO2 Max

VO2 rest

0 2 4 6 8 10 12 14 16 18

Time (mins)



# Time at $v\dot{V}O_2$ Max

- Shorter intervals = more reps
- Short rest periods
- 10 – 15 minutes at  $v\dot{V}O_2$  Max (depending on interval length, rest)

Prerequisite: Running non-stop  
for 45 minutes

# Training session basics

- Warm up, cool down
- Shorter intervals = longer warm-up
- Importance of recovery
- Time and intensity are what's important
  - Not too fast/too slow
  - Not distance

# Sample sessions

- Time based: 60/60, 30/30, 20/20
  - 2x10x30/30, 10x60/60, 3x8x30/30...
- Distance based: Short intervals (<90s)
  - Reps: 14x300m, 8x400m
  - Pyramids:  
2x(100/200/300/400/400/300/200/100)
  - Degressive: 2x400/4x300/6x200/10x100

# Sample sessions

- Distance based: Longer intervals
  - 5x1000m
  - 1200/2x800m/4x600m
- Lower intensity sessions: More time
  - 4x1500m at 97%  $v\dot{V}O_2$  Max (~10k pace)
- Mix and match

Remember: **Time** of effort  
is key parameter

# **Building a training plan**

# Training plan basics

- Season plan: Start slow
- Divide into phases: endurance, speed, race preparation, taper & recovery
- Each phase into 2 week cycles
- Each cycle has a focus
- After each training cycle, recalibrate

# **Sample training plan**

# PLAN D'ENTRAINEMENT

du 09 - 05 - 2011 au 22 - 05 - 2011

SEMAINE : 19

JOURS	DATE	TYPE DE SEANCE	DEVELOPPEMENT	TEMPS	RECUP	KM	KM	OBSERVATIONS
Lundi	9-May	FOOTING	Allure modérée			12		
Mardi	10-May	VITESSE	Echauf. 5 km -1200/1400/1600/1800 - récup 2km	***	1'15	12		Race pace
Mercredi	11-May	REPOS						
Jeudi	12-May	VMA LONGUE	Echauf. 5 km - 6 x 600 - récup 3km	2'09	1'	12		
Vendredi	13-May	REPOS						
Samedi	14-May	REPOS						
Dimanche	15-May	SORTIE LONGUE				20		

SEMAINE : 20

			TOTAL			56	0	
Lundi	16-May	FOOTING	Allure modérée			12		Strength
Mardi	17-May	CONDITION PHYSIQUE	Echauf. 5 km - ESCALIERS URBAN - récup 2km			13		
Mercredi	18-May	REPOS						
Jeudi	19-May	VMA COURTE	Echauf. 5 km - 3 x 7 x 30/30 - récup 3km	163 m	30"	10		VO2 Max
Vendredi	20-May	REPOS						
Samedi	21-May	REPOS						
Dimanche	22-May	SORTIE LONGUE				20		

TOTAL

TOTAL

55

0

SEMI MARATHON

1H28

0:02:05

DAVE

0:02:05

Endurance/  
recovery

\*\*\*

4'24 - 5'04 - 5'48 - 6'38

0:04:10 1000

0:06:15 1500

0:08:20 2000

0:10:25 2500

0:12:30 3000

0:14:35 3500

0:16:40 4000

0:18:45 4500

0:20:50 5000





Thank you!  
Questions?

Dave Neary  
dneary@redhat.com  
@nearyd

# Reading list

- “What is VO2 Max?”: [http://bit.ly/VO2\\_Max](http://bit.ly/VO2_Max)
- “VO2 Max training session”:  
[http://bit.ly/VO2Max\\_training](http://bit.ly/VO2Max_training)
- “Training program basics”:  
[http://bit.ly/Training\\_program](http://bit.ly/Training_program)
- “Daniel's Running Formula” - Dr. Jack Daniels
- 100 Up: <http://hundredup.com>

Dave Neary  
[dneary@redhat.com](mailto:dneary@redhat.com)  
[@nearyd](#)