

le virus Alkhurma

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UMR190 "Émergence des Pathologies Virales"

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Marseille





Virus Alkhurma

Fièvre hémorragique en Arabie Saoudite



Historique

- Virus isolé en 1995 (Zaki et al., 1997) du sang d'un boucher de Jeddah
 - fièvre, céphalées, douleurs rétro-orbitaires, myalgies, vomissements
 - Hémorragies
 - Syndrome de choc
 - Décès
- Identification par Mab → Flavivirus
- 1995-2006: 37 cas
- Mortalité >30%
- Aucune donnée pour les pays limitrophes !



États indiens



- 369
- VOR
- NEG
- BR
- WAL
- R
- SE
- E
- GE
- IYPR
- EU
- S
- SOF
- V
- V
- V
- V
- V
- RBV
- APOIV
- V
- DENV-1
- DENV-3
- DENV-2
- DENV-4
- EV
- IVEV
- EV
- IV
- JNV
- CFAV

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a Tick-E
Fever in

Rémi N. C.
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Epidémiologie à partir de 16 cas confirmés par isolement viral

Table 2 Epidemiological characteristics of 16 laboratory-confirmed^a AHFV-infected patients in Saudi Arabia

Date of isolation	Nationality	Origin	Profession	Age	Sex	Source of infection	Outcome
May 1994	Egyptian	Mecca	Butcher	27	Male	Wound	Death
May 1994	Egyptian	Mecca	Butcher	35	Male	Wound	Recovery
September 1995	Egyptian	Mecca	Butcher	32	Male	Wound	Death
September 1995	Egyptian	Jeddah	Butcher	32	Male	Wound	Recovery
October 1995	Saudi	Jeddah	Soldier	32	Male	Raw camel's milk	Recovery
June 1997	Saudi	Jeddah	Driver	31	Male	Raw camel's milk	Death
March 1998	Saudi	Jeddah	Engineer	58	Male	Tick bite	Recovery
March 1998	Egyptian	Jeddah	Butcher	27	Male	Wound	Recovery
March 1998	Egyptian	Jeddah	Butcher	44	Male	Wound	Recovery
April 1998	Saudi	Jeddah	Student	15	Male	Tick bite	Death
March 1999	Saudi	Jeddah	Unknown	36	Male	Tick bite	Recovery
June 1999	Eritrian	Jeddah	Poultry worker	52	Male	Raw camel's milk	Recovery*
November 1999	Egyptian	Mecca	Butcher	47	Male	Wound	Recovery
March 2001	Saudi	Jeddah	Student	12	Male	Tick bite	Recovery
May 2001	Yemeni	Jeddah	Butcher	38	Male	Tick bite	Recovery
February 2004	Saudi	Al Taief	Housewife	46	Female	Wound	Death

^aInfection was confirmed by viral isolation in all cases

From Charrel et al 2008

Profils cliniques et biologiques de 16 cas confirmés (isolement viral)

Table 1 Clinical and laboratory characteristics of 16 cases^a of AHFV

Symptoms or signs	Number of patients	%
Fever	16	100
Headache	16	100
Malaise	16	100
Myalgias	16	100
Retro-orbital pain	16	100
Generalized body ache	16	100
Anorexia	16	100
Vomiting	10	62.5
Hypotension	5 (fatal cases)	31.25
Central nervous system manifestations (convulsions, coma)	5 (fatal cases)	31.25
Sore throat	5	31.25
Disseminated intravascular coagulation	5 (fatal cases)	31.25
Death	5	31.25
Diarrhea	4	25
Hemorrhagic manifestations	4	25
Encephalitis	4	25
Cough	2	12.5
Skin rash	2	12.5
Hematemesis	2/	12.5
Leukopenia	16	100
Thrombocytopenia $<100 \times 10^9 \text{ L}^{-1}$	16	100
Elevated transaminases	16	100
Highly elevated Creatine phosphokinase	16	100

^aInfection was confirmed by viral isolation in all cases

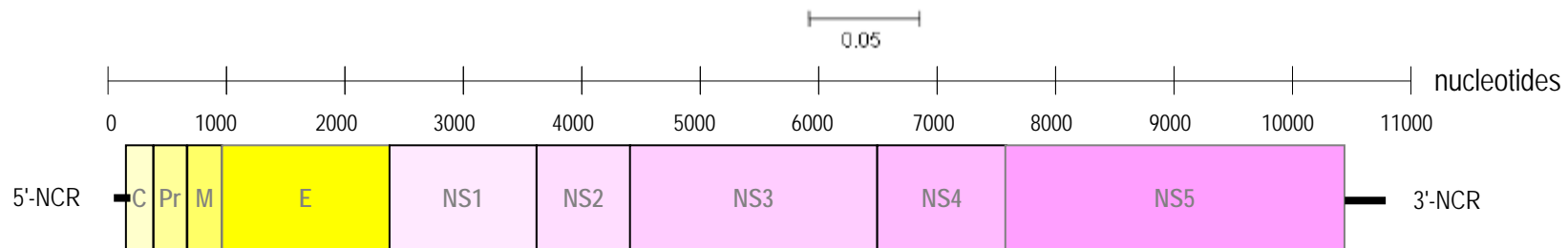
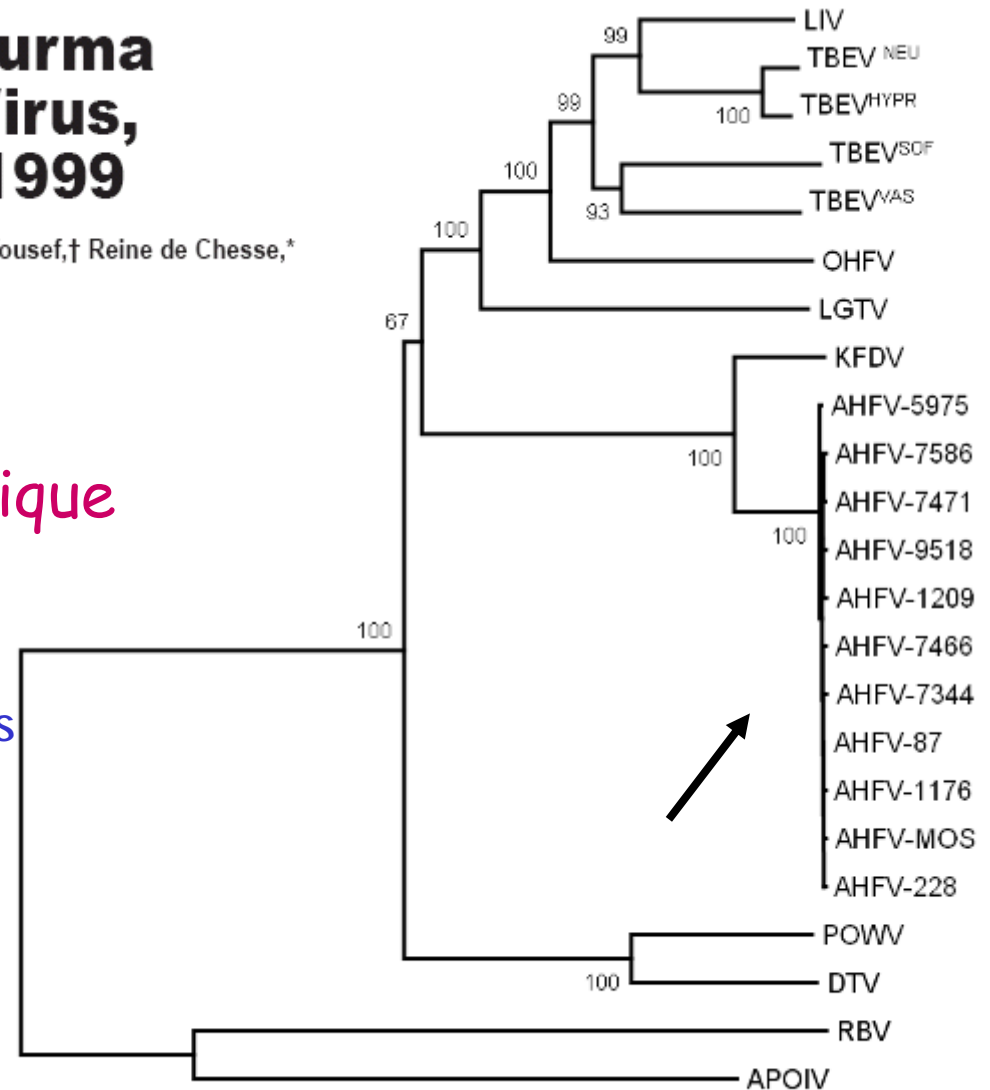
Low Diversity of Alkhurma Hemorrhagic Fever Virus, Saudi Arabia, 1994–1999

Rémi N. Charrel,* Ali Mohamed Zaki,† Mazen Fakeeh,† Amany Ibrahim Yousef,† Reine de Chesse,* Houssam Attoui,* and Xavier de Lamballerie*

Pas de variabilité génétique

Analyse génétique de 11 souches humaines isolées entre 1994 et 1999

Séquence analysée : plus de 2000 nt soit >20% du génome, 3 gènes : envelope, NS3 et NS5



Alkhurma virus est-il transmis par les tiques ?



- **CONTRE** → toutes les souches isolées à partir de prélèvements humains
- **POUR**
 - 5 cas avec notion de piqûre de tique
 - génétiquement au milieu des flavivirus transmis par les tiques
 - distribution des cas selon 2 pics coïncident avec l'activité des tiques

place of collection	identification	animal	number of ticks	date of collection
Jeddah North East	<i>Ornithodoros savignyi</i> nymphs & adults <i>Hyalomma spp</i>	camels & camel resting place	64	June 2004
Jeddah South East	<i>Ornithodoros savignyi</i> nymphs & adults <i>Hyalomma spp</i>	camels & camel resting place	32	June 2004
Kilaakh (50 km from Taif)	<i>Hyalomma dromedarii</i>	camels	28	January 2005



ARGASIDAE (carapace molle)

Argas

Carios

Ornithodoros

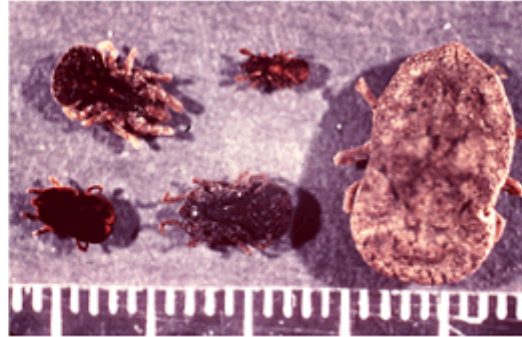
Otobius

Table 1. Summary of some of the most important soft tick species found attached to human victims, with data on their vectorial capacity and geographical distribution

Species	Pathogen	Distribution
<i>Argas monolakensis</i>	Mono Lake virus	Western USA
<i>A. reflexus</i>	–	Southeastern Europe
<i>Ornithodoros asperus</i>	<i>Borrelia caucasica</i>	Caucasus, Iraq
<i>O. capensis</i>	Soldado virus	Cosmopolitan
<i>O. coriaceus</i>	<i>Borrelia coraciae</i>	Pacific coast of USA into Mexico
<i>O. erraticus</i>	<i>Borrelia crocidurae</i>	North and East Africa, Near East, Southeastern Europe
<i>O. erraticus</i>	<i>Borrelia hispanica</i>	Spain, Portugal
<i>O. hermsi</i>	<i>Borrelia hermsi</i>	Western USA
<i>O. maritimus</i>	Soldado virus	France
<i>O. moubata</i>	<i>Borrelia duttoni</i>	East Africa and Southern Africa
<i>O. tartakovskyi</i>	<i>Borrelia latyschevi</i>	Central Asia
<i>O. turicata</i>	<i>Borrelia turicatae</i>	Southwestern USA, Central America
<i>O. savignyi</i>	–	Africa and parts of Asia

Famille Argasidae (Tiques a carapace molle):

Ornithodoros (daim, bovin)



Experimental and Applied Acarology 23: 685–715, 1999.

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Review

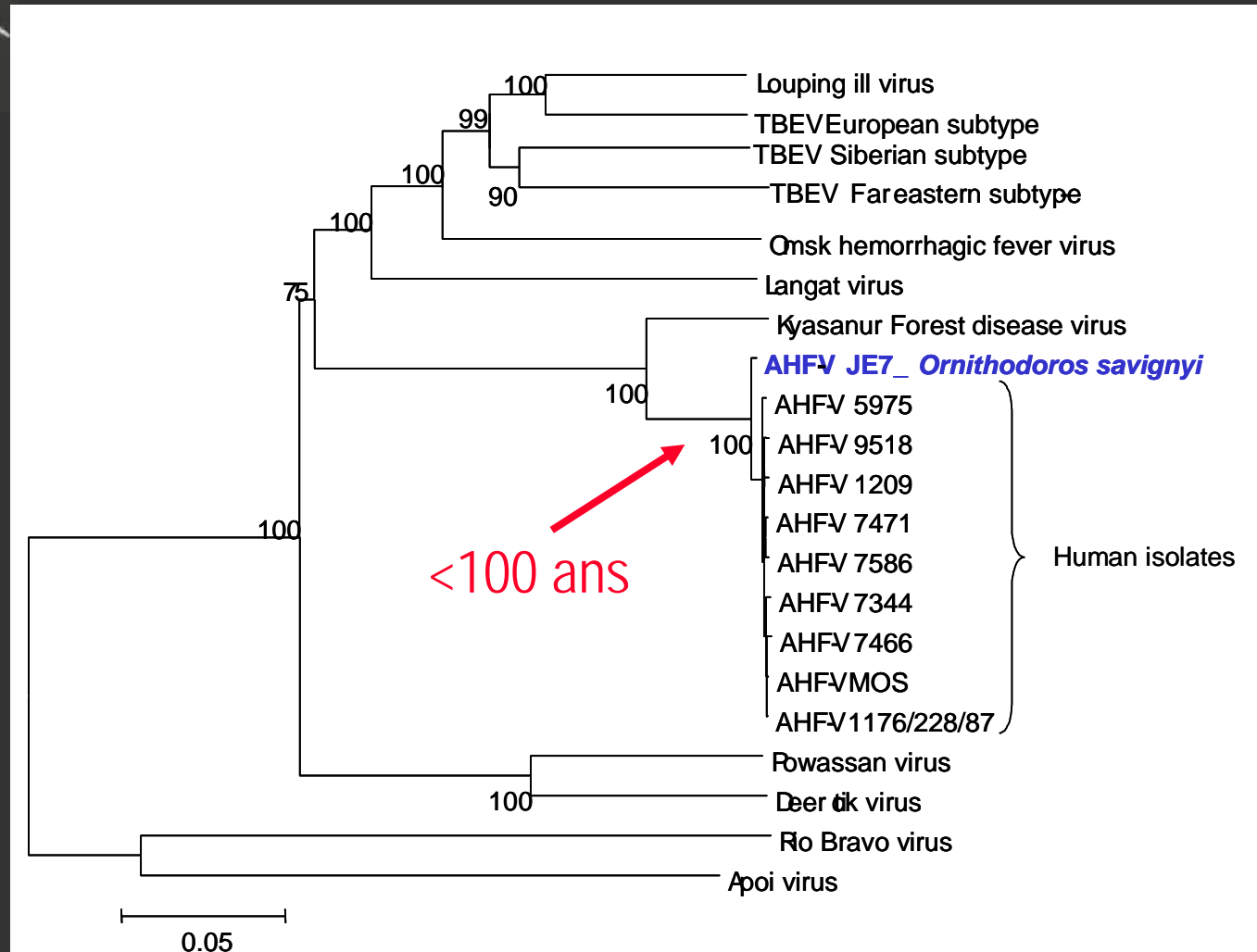
Ticks feeding on humans: a review of records on human-biting Ixodoidea with special reference to pathogen transmission

AGUSTIN ESTRADA-PEÑA^{1*} and FRANS JONGEJAN²

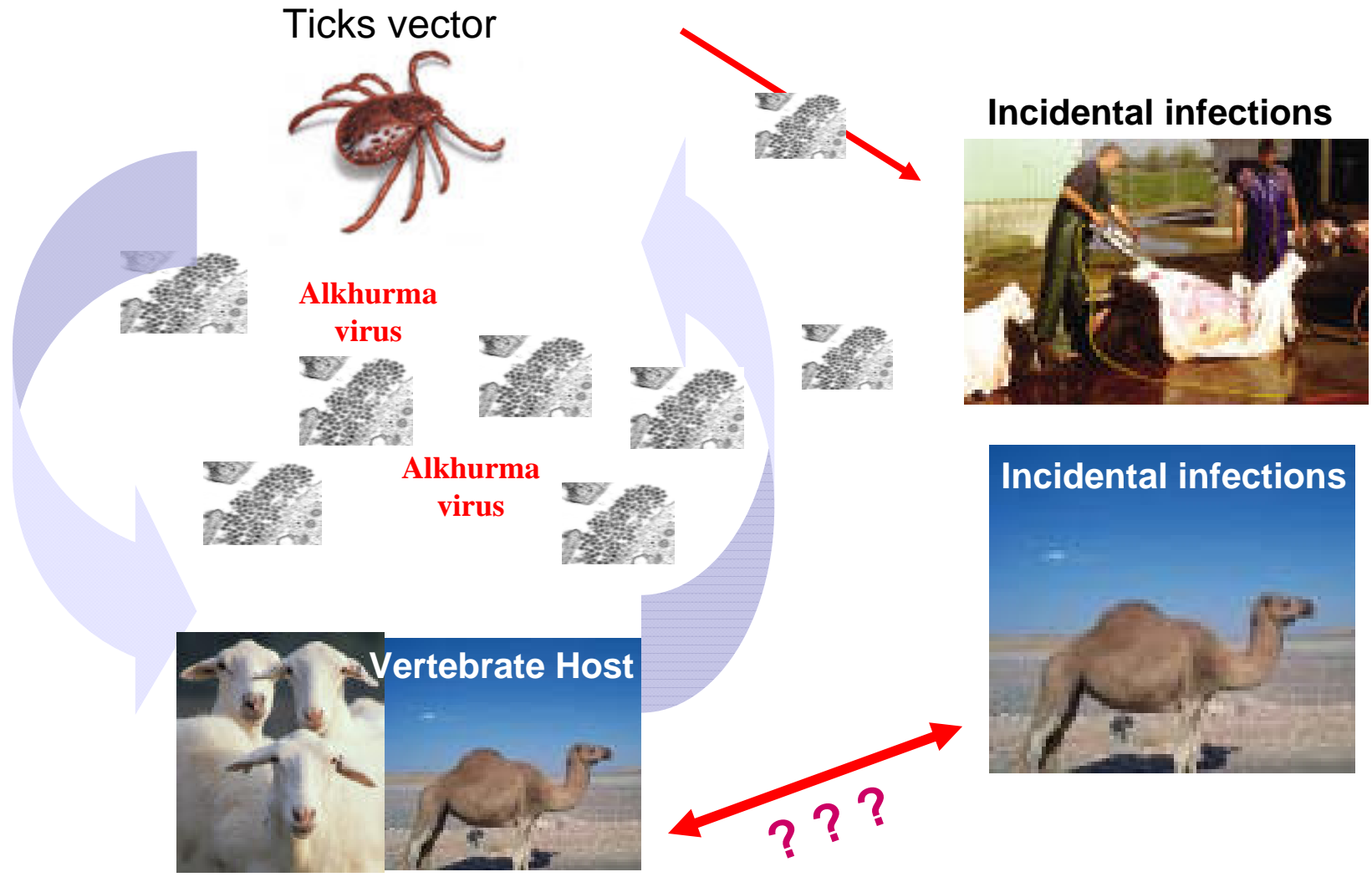
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Alkhurma virus est-il transmis par les tiques ?



Proposed AHFV Transmission Cycle



conclusions

- *Alkhurma virus* est un nouveau flavivirus responsable de fièvres hémorragiques en Arabie Saoudite
- le taux de mortalité est élevé > 30% des cas hospitalisés
- la transmission à l'homme s'opère par contact direct, voie digestive, piqûre de tiques

- sa distribution géographique est mal connue
- il n'existe pas de données de séroprévalence (neutralisation)
- le cycle naturel est mal connu

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